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"OLD NOISY GONG" **Whistles**

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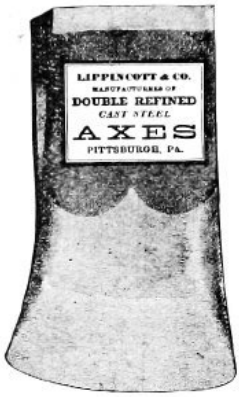
AXES.

ZELNICKER AXES

ARE MADE OF

SPECIAL SOFT STEEL

Extra Quality and Extra Full Weight, Crucible Cast Steel Bits.



Zelnicker. Fire blue, hand made, 1 dozen in box, assorted sizes 3½ to 4½, 4 to 5, 4½ to 5½ ..... per doz., $

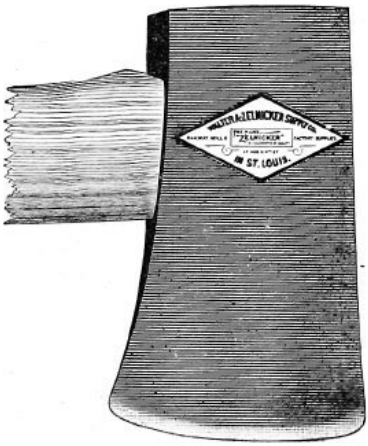
Lippincott. Bronzed, polished head and bit, 1 dozen in box, assorted sizes 3½ to 4½, 4 to 5, 4½ to 5½ ..... per doz.,

Hunt's. Bronzed, polished head and bit, 1 dozen in box, assorted sizes 3½ to 4½, 4 to 5, 4½ to 5½ ..... per doz.,

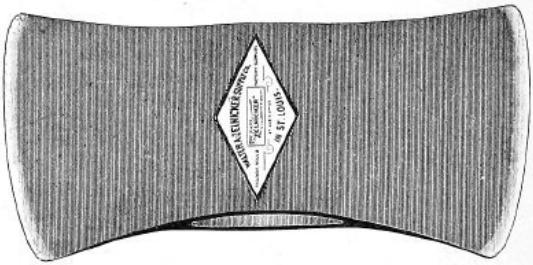
Hubbard's. Painted blue, polished bit, 1 dozen in box, assorted sizes 3½ to 4½, 4 to 5, 4½ to 5½ ..... per doz.,

Zelnicker Handled Axe. Fire blue, assorted sizes 3½ to 4½, 4 to 5, 1 dozen in box, per doz ..... per doz.,

Hubbard's Handled Axe. Painted blue, polished bit, assorted sizes 4 to 5, 4½ to 5½, 1 dozen in box ..... per doz.,

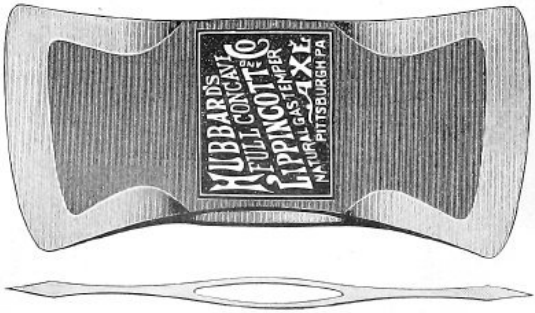


AXES.



Zelnicker. Double bit, fire blue, hand made, assorted 3½ to 4½, 4 to 5, 4½ to 5½, 1 dozen in box.....per doz., $

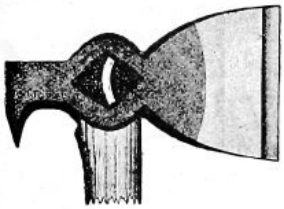
Lippincott. Double refined double bit, assorted 3½ to 4½, 4 to 5, 4½ to 5½, 1 dozen in box.....per doz., $



Hubbard. Full concave, double bit, assorted 3½ to 4½, 4 to 5, 4½ to 5½, 1 dozen in box.....per doz., $

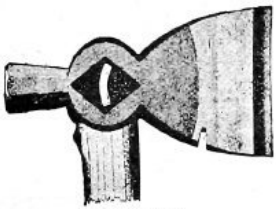
HATCHETS.

Solid Steel, finest quality.



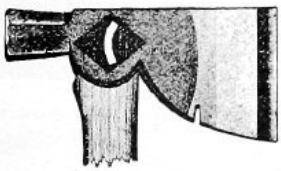
CLAW.

No.	Bronzed, per doz.	Half Polished, per doz.	Full Polished, per doz.
1	$ 9.00	$10.25	$10.50
2	9.50	10.75	12.00
3	10.00	11.25	12.50



SHINGLING.

No.	Bronzed, per doz.	Half Polished, per doz.	Full Polished, per doz.
0	$7.50	$ 8.75	$10.00
1	8.00	9.25	10.50
2	8.50	9.75	11.00
3	9.00	10.25	11.50
4	9.50	10.75	12.00

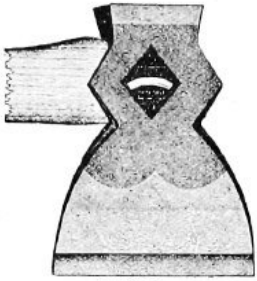


HALF HATCHET.

No.	Bronzed, per doz.	Half Polished, per doz.	Full Polished, per doz.
1	$ 8.50	$ 9.75	$11.00
2	9.00	10.25	11.50
3	9.50	10.75	12.00
4	10.00	11.25	12.50

HATCHETS

Solid Steel, finest quality.

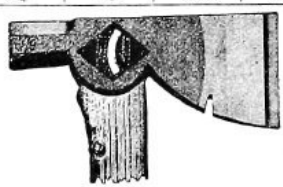


BROAD.

No.	Bit, inches.	Bronzed, per doz.
1	4	$10.50
2	4½	11.50
3	5	13.00
4	5½	14.50
5	6	16.50
6	6½	18.00
7	7	19.50
8	7½	22.00

HUNTERS.'

No	Weight, each lbs.	Length Handle, inches.	Bronzed, per doz.	Full Polished, per doz.
0	1	13	$ 9.00	$11.50
1	1½	14	10.00	12.50
2	1¾	16	11.00	13.50
3	2	17	12.00	14.50
4	2¼	18	13.00	15.50



LATHING.

No.	Bronzed, per doz.	Half Polished, per doz.	Full Polished, per doz.
0	$7.50	$ 8.75	$10.00
1	8.00	9.25	10.50
2	8.50	9.75	11.00
3	9.00	10.25	11.50
4	9.50	10.75	12.00

ADZES.

RAILROAD.

Width of bitt, 4½ to 5½ inches. Weight, 4 to 4½ lbs.
Price per dozen.....$26.00

HOUSE CARPENTERS.

Width of bitt, 4 to 4½ inches. Weight, 3 to 4½ lbs.
Price per dozen.....$24.00

SHIP CARPENTERS.

Width of bitt, 4 to 4¼ inches. Weight, 2½ to 3 lbs.
Price per dozen.....$25.00

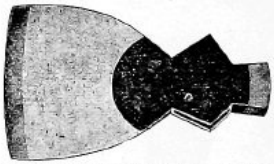
SHIP CARPENTERS' ADZE.

WITH SIDE LIPS

Width of bitt, 4 to 4¼ inches. Weight, 4 to 5½ lbs.
Price per dozen.....$30.00

SHIP AXES.

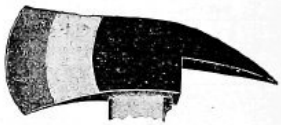
BRONZED.



Width of bitt, 6½ to 7½ inches. Weight, 5 to 6 lbs.
Price per dozen.....$30.00

FIREMEN'S HANDLED AXES.

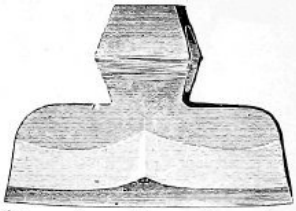
REFINED CAST STEEL



Width of cut, 4½ inches. Price per doz. $30.00

BROAD AXES.

Cut 9 to 12 inches.



Weight, lbs....	6	6½	7	8	9
Price per doz..	$40.00	$41.00	$42.00	$44.00	$46.00

EUREKA POST HOLE DIGGER

Price.....per doz., $15 00

Handled Post Mauls, Adze Eye.

No. 2—	Pounds,	10	13	16
	EACH,	$0.80	.90	1.00

RAILROAD OR CLAY PICKS.
Adze Eye.

Painted black, polished points.

Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.
4 to 5	$11.50	7 to 8	$14.50
5 to 6	12.50	8 to 9	16.50
6 to 7	13.50	9 to10	18.50

ORE PICKS.
Adze Eye.

Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.
5 to 6	$12.50	8 to 9	$16.50
6 to 7	13.50	9 to 10	18.50
7 to 8	14.50		

RAILROAD TAMPING PICKS.
Adze Eye.

V-head—Extra strong eye—oil finished.

Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.
6 to 7	$18.00	8 to 9	$20.00
7 to 8	19.00		

STRAIGHT WEIGHTS.

Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.
6	$18.00	8	$19.50
7	18.50	9	21.00

CONTRACTORS' PICKS.
Adze Eye.

Oil finished.

Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.
7	$18.00	9	$21.00
7½	18.50	9½	22.00
8	19.00	10	23.00
8½	20.00		

SURFACE PICKS.
Adze Eye.

Oil finished.

No.	Weight, lbs.	Price, per doz.	No.	Weight, lbs.	Price, per doz.
1	4	$14.00	5	6	$18.00
2	4½	15.00	6	6½	19.00
3	5	16.00	7	7	20.00
4	5½	17.00			

Our Picks are all packed two dozen to a case.

DRIFTING PICKS.
Adze Eye.

Oil finished.

No.	Weight, lbs.	Price, per doz.	No.	Weight, lbs.	Price, per doz.
1	3	$12.50	4	5	$16.00
2	4	14.00	5	6	17.50
3	4½	15.00			

POLL PICKS.
Adze Eye.

Oil finished.

No.	Weight, lbs.	Price, per doz.	No.	Weight, lbs.	Price, per doz.
1	3½	$15.00	4	5	$18.50
2	4	16.00	5	6	20.00
3	4½	17.00	6	6½	21.50

PICK EYES.
Drawn ready for the steel.

DRIFTING.
3 to 5 dozen in a case.

No.	Weight, lbs.	Price, per doz.	No.	Weight, lbs.	Price, per doz.
1	3	$7.50	4	5	$ 9.50
2	4	8.50	5	6	10.00
3	4½	9.00			

RAILROAD PICK EYES.

No.	Weight, lbs.	Price, per doz.	No.	Weight, lbs.	Price, per doz.
1	4½	$ 9.00	5	8	$12.50
2	5	9.50	6	9	13.50
3	6	10.50	7	10	14.50
4	7	11.00			

STONE AND QUARRY PICKS.
STONE.

QUARRY.

Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.	Weight, lbs.	Price, per doz.
4	$14.00	6½	$16.50	8½	$18.50
4½	14.50	7	17.00	9	19.00
5	15.00	7½	17.50	9½	19.50
5½	15.50	8	18.00	10	20.00
6	16.00				

MILL PICKS.
Cast steel, 2 to 3 lbs.....per doz., $22.00

COAL PICKS.

Pointed with best tool steel. lacquer finish.

SHORT EAR CUTTING.

Weight, lbs.	Price per Dozen.	Weight, lbs.	Price per Dozen.
2½	$ 9.00	3¾	$10.50
2¾	9.50	4	10 50
3	9.50	4¼	11.00
3¼	10.00	4½	11.00
3½	10.00	5	11.50

SHORT EAR MINING.

Weight, lbs.	Price per Dozen.	Weight, lbs.	Price per Dozen.
1½	$8.50	2½	$9.00
1¾	8.50	2¾	9.50
2	8.50	3	9.50
2¼	9.00		

LONG EAR CUTTING.

Weight, lbs.	Price per Dozen.	Weight, lbs.	Price per Dozen.
2½	$ 9.00	3¾	$10.50
2¾	9.50	4	10.50
3	9.50	4¼	11.00
3¼	10.00	4½	11.00
3½	10.00	5	11.50

LONG EAR MINING.

Weight, lbs.	Price per Dozen.	Weight, lbs.	Price per Dozen.
1½	$8.50	2½	$9.00
1¾	8.50	2¾	9.50
2	8.50	3	9.50
2¼	9.00		

All our Coal Picks are packed 5 dozen in a case.

MATTOCKS.

Adze Eye.

LONG OR SHORT CUTTER.

PICK MATTOCKS.

Packed two dozen in a case. Polished and painted black.

Style.	Weight, lbs.	Size Blade, in.	Size Cutter, in.	Price per Dozen.
Short Cutter	3	3 x 7	2½ x 4¼	$16.00
" "	4	3½ x 7½	2½ x 4¼	16.00
" "	5	3½ x 7½	2½ x 4¼	16.00
" "	5½	4¼ x 8¼	3 x 4½	16.50
Long "	5	3½ x 7½	2½ x 5¼	16.00
" "	6	4¼ x 8½	3 x 6	17.00
Pick	5	4 x 8	8 in. long	16.00
"	6	4¼ x 8½	8½ " "	17.00

ASPHALT MATTOCKS.

Solid steel. Heavy eye. Oil finished. Packed 2 dozen in a case.

Weight, lbs.	Price per Dozen.	Weight, lbs.	Price per Dozen.
9	$25.00	11	$30.00

GRUB HOES.

WESTERN PATTERN.

No.	Weight, lbs.	Size, inches.	Price per Dozen.
0	3	3½ x 10½	$11.50
1	3½	3¾ x 10¾	12.00
2	4	4 x 11¼	12.50
3	4½	4¼ x 11½	13.00

ACCOMAC PATTERN.

No.	Width, inches.	Price per Dozen.
1	6	$18.00
2	6½	19 00
3	7	20.00

HAZEL PATTERN.

No.	Weight, lbs.	Width, inches.	Price per Dozen.
1	3	6	$14.00

"ZELNICKER"

Second Growth, Hand Shaved

HICKORY HANDLES.

A strictly high-grade Handle is the cheapest in the long run, and these Handles will outlast a half dozen of the ordinary grades.

"Zelnicker" Hammer Handles.		List.
14 inch	per doz.,	$2 00
16 "	"	2 30
18 "	"	2 50
20 "	"	2 70
22 "	"	3 00
24 "	"	3 30
26 "	"	3 50
30 "	"	3 80

"Zelnicker" Sledge Handles.		
30 inch oval Sledge Handles	per doz.,	$3 80
30 " octagon "	"	3 80
36 " oval "	"	4 00
36 " octagon "	"	4 00

"Zelnicker" Axe Handles	per doz.,	$5 80
" R. R. or Ship Adze Handles	"	7 80
" Railroad Pick Handles	"	8 00
" Coal " " 34 in	"	5 80

All "Zelnicker" Handles have our label on each Handle and are branded on the end. The hickory is first selected, and after being shaved, they are again selected and then, after being received in St. Louis from our factory, are again inspected and selected.

We ship none but absolutely perfect Handles.

AXE HANDLES.

Octagon and Oval Hand Shaved.

Single Bitted.

ADZE HANDLES.

Double Bitted.

BROAD AXE HANDLES.

Hand Shaved Hickory Axe Handles

Octagon and Oval Hand Shaved, single and double bit.	XXX	XX	X		
Axe Handles—**36**, 34, 32 and 30 inch, plain end, per doz	4 40	3 60	2 80		
" 38 " "	4 60	3 80	3 00		
" 40 " "	5 00	4 10	3 25		
" **36** and 34 inch, scroll end "	4 70	3 90	3 10		
" **36** inch, Straight Lumberman's "	4 40	3 60	2 80		
" 38 " " " "	4 60	3 80	3 00		

Broad Axe Handles . . . . . per dozen, **$3 75**

	Extra.	Exter.	No. 1.
Adze, House Carpenter, Ship and R. R., 36, **34** and 32 inch	4 00	3 50	2 75

Turned Hickory Axe Handles

Market and N. N. Y. Patterns.	Extra.	Exter.	No. 1	No. 2	No. 3
Axe Handles—**36** and 34 inch . . . . . per doz.	3 75	3 00	2 50	2 00	1 65
" 32 and 30 inch . . . . . "	3 75	3 00	2 50	2 00	1 65
" Boys' 28 and 26 inch . . . "	2 75	2 25	1 80	1 50	.....
" 38 inch, single and double bit "	4 00	3 25	2 60	2 10	1 70
" 40 " " " "	4 50	3 75	3 00	2 20	1 80
" 42 " " " "	5 00	4 00	3 20	2 40	1 90
" 44 " " " "	5 60	4 50	3 50	2 60	2 00
" Straight 30 to **36** inches "	3 75	3 00	2 50	2 00	1 65
" Double Bitted 30 to **36** inches "	3 75	3 00	2 50	1 80	1 50

RAILROAD PICK HANDLES.

MINING PICK HANDLES

Drifting Pick.

Poll Pick.

Surface or R. R., Mattock, and Miners'.		Extra.	Exter.	No. 1.	No. 2.	No. A.
Pick Handles—Surface or R. R., 36 inch	per doz.	4 50	3 75.	3 00	2 25	1 90
" Drifting, 32, **34** and 36 inch	"	3 75	3 00	2 50	.....	.....
" Poll, 32, **34** and 36 inch	"	3 75	3 00	2 50	.....	.....
" Coal Miners' Small Eye, 3x⅝, 34	"	3 25	2 15	1 75	.....	.....
" " Medium Eye, 3x¾, 34	"	3 25	2 15	1 75	.....	.....
" " Large Eye, 3⅛x⅞, 34	"	3 25	2 15	1 75	.....	.....
Grub Hoe Handles, 36 inch	"	4 50	3 75	3 00	2 25	1 90
Post Maul Handles, 30 to 36 inch	"	3 50	3 00	2 50	2 00	.. ..

Hand Shaved Pick, add 45 cents per dozen to above prices.

TURNED SLEDGE, TOOL AND MAUL HANDLES.

Sledge, Tool or Maul.	Length.	24 in.	26 & 28 inch.	30 & 32 inch.	34 & 36 inch.	38 in.	40 in.	42 in
Extra	per doz.	1 45	1 90	2 10	2 50	2 65	2 85	3 10
No. 1	"	1 25	1 45	1 65	2 00	2 15	2 25	2 50
No. 2	"	90	1 15	1 25	1 40	1 50	1 75	2 00

Hand Shaved Sledge, add 40 cents per dozen to above prices

TURNED HAMMER AND HATCHET HANDLES.

Adze Eye Hammer.

Round Eye Hammer

Striking Hammer.

Riveting Hammer.

Blacksmiths' Hammers.

Hatchet.

Length—	11	12	13	14	15	16	17	18	19	20	22	24 in.
Machinists' Hammer. per doz.	70	70	70	70	70	80	80	90	1 05	1 05	1 15	1 25
Blacksmiths' Hammer "	70	70	70	70	70	80	80	90	1 05	1 05	1 15	1 25
Riveting Hammer "	70	70	70	70	70	80	80	90	1 05	1 05	1 15	1 25
Hammer, A. & R. E. "	....	70	70	75	75	....	....	....	....	....	....	....
Hatchet, Broad or Bench "	....	....	....	....	....	85	90	1 10	1 25	1 25	....	....
" Shingle "	....	70	70	75	75	....	....	....	....	....	....	....

WOOD D HANDLES.

For Socket or Hollow Back Shovels.

For Coal Shovels.

For Coke or Coal Forks.

KIND.	X X. Price per Dozen.	X. Price per Dozen.	No. 1. Price per Dozen.
For Socket or Hollow Back Shovels	$4.50	$3.50	$2 90
For Socket or Hollow Back Scoops	4.50	3.50	2.90
For Spades	4.50	3.50	2.90
For Coal Shovels	4.10	3.35	2.75
For Coal or Coke Forks	3 75	3.00	2.50
For Spading Forks	3.75	3.00	2.50
For Ditching Spades	5.00	4.00	3.00
For Manure Forks	3.75	3.00	2.50

LONG HANDLES.

BENT.

KIND.	Length, feet.	X X. Price per Dozen.	X. Price per Dozen.	No. 1. Price per Dozen.
For Shovels	4½	$4.00	$3.00	$2.50
For Spades	4½	3.50	2.50	2.00
For Scoops	4½	4.00	3.00	2.50
For Spading Forks	4½	3.00	2.00	1.60
For Manure Forks	4	2.75	1.90	1 30
For Manure Forks	4½	3.00	2.10	1.60
For Manure Forks	5	3.65	2.55	1.95
For Manure Forks	5½	4.45	3.15	2.40

We can furnish these handles straight at the same prices. We can make them shorter or longer than listed if desired.

MALLEABLE "D'S."

OR SHOVEL OR FORK HANDLES.

Wood head, malleable fork and socket.....per doz., $2.00
All iron, for railroad tamping..... " 3.00

Wood Head.

Iron Head.

MACHINIST HAMMERS.

BALL PEIN.

STRAIGHT PEIN.

CROSS PEIN.

Size	00000	0000	000	00	0	1	2
Weight	4 oz.	6 oz.	8 oz.	12 oz.	1 lb.	1 lb. 4 oz.	1 lb. 8 oz.
Price per dozen	$12.00	12.00	12.00	12.00	12.50	13.50	14.50

Size	3	4	5	6	7	8
Weight	1 lb. 12 oz.	2 lb.	2 lb. 4 oz.	2 lb. 8 oz.	2 lb. 12 oz.	3 lb.
Price per dozen	$15.50	16.50	17.50	19.00	20.50	22.00

Weight does not include handle.

BLACKSMITH HAND HAMMERS.

Size		1	2
Weight	1 lb. 10 oz.	2 lb.	2 lb. 10 oz.
Price per dozen	$13.00	14.00	15.00

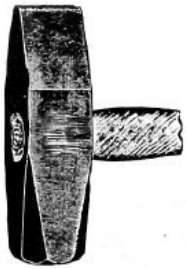
Size	3	4	5
Weight	3 lb.	3 lb. 8 oz.	4 lb. 8 oz.
Price per doz	$16.00	17.00	19.00

ENGINEERS' HAMMERS.

Size	0	1	2	3
Weight	1 lb. 2 oz.	1 lb. 10 oz.	2 lb.	2 lb. 8 oz.
Price per dozen	$12.00	13.00	14.00	15.00

Size	4	5	6
Weight	3 lb.	3 lb. 8 oz.	4 lb. 8 oz.
Price per dozen	$16.00	17.00	19.00

CHIPPING HAMMERS.



Size	0	1	2	3	4
Weight	1 lb. 4 oz.	1 lb. 8 oz	2 lb.	2 lb. 8 oz.	2 lb. 14 oz.
Price per dozen	$13.00	13.50	14.50	15.50	16.50

PLAIN EYE RIVETING HAMMERS.

Size	0	1	2	3
Weight	4 oz.	7 oz.	9 oz.	12 oz
Price per dozen	$5.50	5.75	6.00	6.25

Size	4	5	6	7
Weight	15 oz	1 lb. 2 oz.	1 lb. 6 oz.	1 lb. 10 oz
Price per dozen	$6.50	7.00	7.50	8.00

ADZE EYE NAIL HAMMERS.

Number	1	1½	2	3
Weight	1 lb. 4 oz.	1 lb.	13 oz.	7 oz.
Price, per doz.	$9.00	$8.50	$8.00	$7.50

MALLETS.

ROUND.

		Length. Inches.		Diameter. Inches.	Per Dozen.
No. 2.	Hickory, Mortised Handle	5½	x	3½	$2.00
No. 3.	" " "	6	x	4	2.50
No. 5.	Lignumvitae. " "	5	x	3	3.00
No. 6.	" " "	5½	x	3½	4.00
No. 7.	" " "	6	x	4	5.00

PATENT HIDE-FACED HAMMERS AND MALLETS.

HAMMERS.

Number	1	2	3	4	5
Weight.....Pounds	1	1½	2	4	5½
Price.....Each	.75	.96	1.15	1.65	2.35
Extra Faces.....Per pair	.16	.20	.25	.35	.50

One pair of extra faces sold with each hammer and when worn out they can be renewed at slight cost.

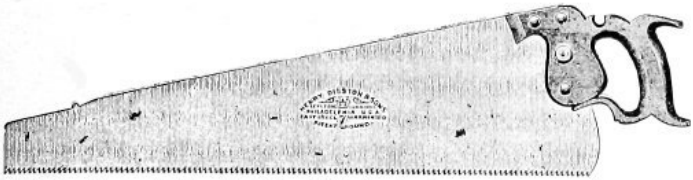
MALLETS.

Number	0	1	2	3	4	5	6
Diameter.....Inches	1	1¼	1½	1¾	2	2¾	2¾
Length.....Inches	2½	2¼	3	3½	3¼	4¼	4¾
Weight.....Ounces	1½	3½	6	7½	10	21	23
Price.....Each	.20	.25	.30	.35	.45	1.00	1.25

LOADED MALLETS.

Number	7	8	9	10	11
Diameter.....Inches	1¼	1½	1¾	2	2¾
Length.....Inches	2¾	3	3⅛	3¼	4¼
Weight.....Ounces	7	12	15	20	42
Price.....Each	.30	.35	.40	.50	1.00

HAND, PANEL AND RIP SAWS.



DISSTON'S CAST STEEL No. 7.

Cast steel, warranted, beech handle, polished edge, four improved screws; blade grained and etched.

Inches	14	16	18	20	22	24	26	28	30	32	34	36
Per dozen	$12 00	$13.00	$14.00	$16.00	$18.00	$19.00	$20.00	$23.50	$27.00	$30.50	$34.50	$39.00

DISSTON'S SPRING STEEL No. 8-D.

Warranted spring steel, patent ground and tempered, skew back saw, apple handle, polished edge, five improved screws. Rip saws with graduated teeth.

Inches	16	18	20	22	24	26	28	30
Per dozen	$14.50	$16 00	$17.50	$19.50	$21.00	$22.00	$25.00	$28.00

DISSTON'S EXTRA REFINED SPRING STEEL No. 12.

Warranted extra refined London spring steel, selected and highly polished blade, handle carved and polished, four improved brass screws, finest saw made.

Inches	16	18	20	22	24	26	28	30
Per dozen	$18.00	$20.00	$22.00	$24.00	$26 00	$28.00	$32.00	$37.00

CHIEF No. 62.

Special steel, beech handle; a good cheap saw.

Inches	20	22	24	26	28
Per dozen	$9.00	$9.75	$10.50	$11.35	$12.00

WINNER No. 45.

Cast steel, beech handle, polished edge, 3 brass screws.

Inches	20	22	24	26	28
Per dozen	$7.20	$7.75	$8,40	$9.00	$10.20

ALL OF OUR SAWS ARE PACKED 1-3d DOZEN IN BOX.

DEXTER

LIST PRICE.

	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.	6½ ft.	7 ft.	7½ ft.	8 ft.
Special Steel, Thin-Back, 14 x 18 gauge, or Extra Thin-Back, 14 x 19 gauge.	$3.20	$3.60	$4.00	$4.40	$4.80	$5.20	$5.60	$6.00	$6.40
Special Steel, Regular, 14 x 16 gauge	3.04	3.42	3.80	4.18	4.56	4.94	5.32	5.70	6.08
Silver Steel, 14 x 16, 14 x 18 or 14 x 19 gauge	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00

TUTTLE

List Price. Special Steel, Without Handles.

	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.	6½ ft.	7 ft.	7½ ft.	8 ft.
Regular Gauge, 14 x 16 gauge	$1.84	$2.08	$2.30	$2.54	$2.76	$3.00	$3.22	$3.46	$3.68
Thin-Back, 14 x 18 gauge	2.00	2.26	2.50	2.76	3.00	3.26	3.50	3.76	4.00
Extra Thin-Back, 14 x 19 gauge	2.50	2.76	3.00	3.26	3.50	3.76	4.00	4.26	4.50

Hollow-Back Saws...

Diamond Tooth

	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.	6½ ft.	7 ft.	7½ ft.	8 ft.
List Price, Diamond Tooth, without Handles	$1.20	$1.35	$1.50	$1.65	$1.80	$1.95	$2.10	$2.25	$2.40

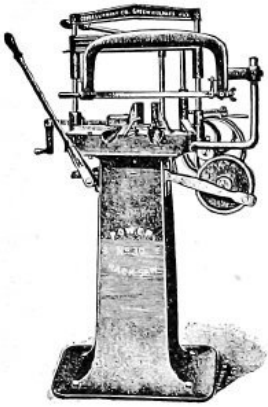
ONE-MAN SAWS

Tuttle Tooth

	3 ft.	3½ ft.	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
List Price, Tuttle Tooth, including Handles	$1.80	$2.10	$2.40	$2.70	$3.00	$3.30	$3.60

POWER HACK SAW.

NO. 30.



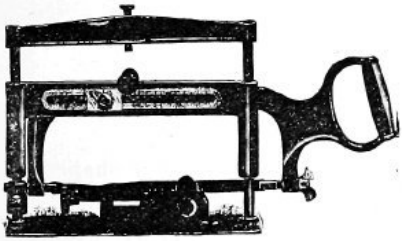
Power Hack Saws have become so well known to all classes of metal workers that we do not feel called upon to make allusion to their general usefulness. No up-to-date shop can afford to be without one; often where one is in use, two would be found equally profitable.

The Vise will take in work 4½ by 4½ inches, and is operated by a handled screw, as shown in the cut. The bed of the Vise extends beyond the jaws, another feature which will at once commend itself.

The machine is thoroughly well made and practical in all its workings.

$30.00

BENCH HACK SAW.



A Bench Hack Saw is a device for which there has long been a place in repair shops, stores, and small factories. It can be readily fastened to any bench, and will pay for itself in a week's time where iron, steel, or brass rod or tubing have to be cut off.

One Goodell 9-inch Blade is furnished with each machine, which hould be strained well in the frame when in use. It is so constructed that 8-inch Blades can be used when desired.

Price each..... .....$3.50

GOODELL ADJUSTABLE HACK-SAW FRAMES.

		Per Dozen.
No. 02.	Finished in natural steel, not polished or nickeled; adjustable from 8 inches to 12 inches; constructed in a thoroughly first-class manner; a very serviceable Frame at a moderate price, ...	$8.50

GOODELL HACK-SAW SETS.

FRAMES.—The Frames are Solid Steel, Natural Finish; Blades can be faced four ways.

BLADES.—Twelve regular-teeth Blades, corresponding in length to the size of the Frame, put up with each set.

		Per Set.
No. 812.	8-inch Frame and 12 Blades, ...	$1.05
No. 912.	9-inch Frame and 12 Blades, ...	1.15
No. 1012.	10-inch Frame and 12 Blades, ...	1.35
No. 1112.	11-inch Frame and 12 Blades, ...	1.50
No. 1212.	12-inch Frame and 12 Blades,	1.65

GOODELL HACK SAWS.

PRICE LISTS.

REGULAR. 14 teeth to the inch.

For Iron or Steel.

	Per Dozen.	Per Gross.
8 inch, ...	$0.65	$7.80
9 inch, ...	.70	8.40
10 inch, ...	.85	10.20
11 inch, ...	.95	11.40
12 inch, ...	1.05	12.60
13 inch, ...	1.15	13.80
14 inch, ...	1.25	15.00

FINE. 20 teeth to the inch.

For Brass or Tubing

	Per Dozen.	Per Gross.
8 inch, ...	$0.65	$7.80
9 inch, ...	.70	8.40
10 inch, ...	.85	10.20
11 inch, ...	.95	11.40
12 inch.	1.05	12.60

EXTRA FINE. 32 teeth to the inch.

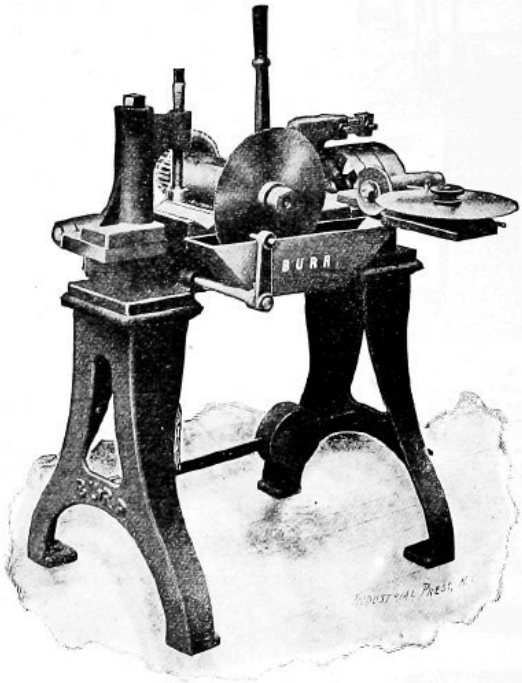
For thin Steel Tubing.

	Per Dozen.	Per Gross.
8 inch, ...	$0.65	$7.80

All Blades packed half gross in a box.

☞ Regular blades, 14 teeth to the inch, always sent unless otherwise specified.

THE BURR COLD SAW.

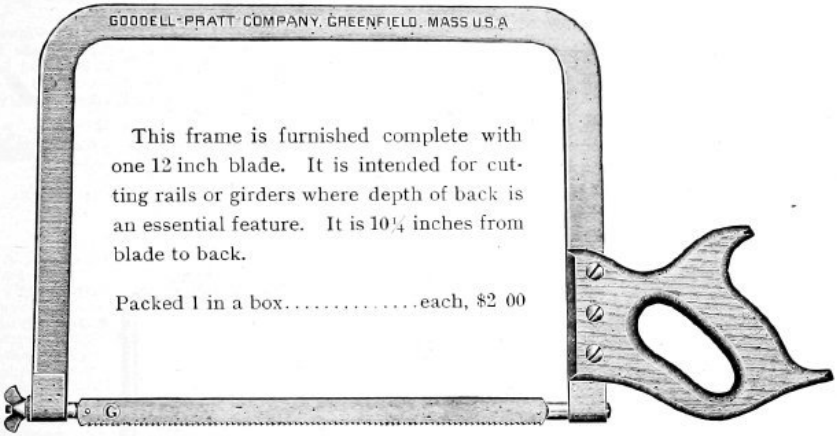


The Burr Cold Saw will cut off round, square or other shaped stock, pipe, etc., up to 3½ inches round. It is a well built, efficient tool, using a 10 inch circular saw and driven by a powerful system of gearing. We furnish with each machine an efficient saw-grinding attachment, which is a necessity with any cold saw.

Price of the Burr Cold Saw, complete with Saw-Grinding Attachment, one saw, and emery wheel, skidded.....$100 00

Extra Saws.....each, 6 75

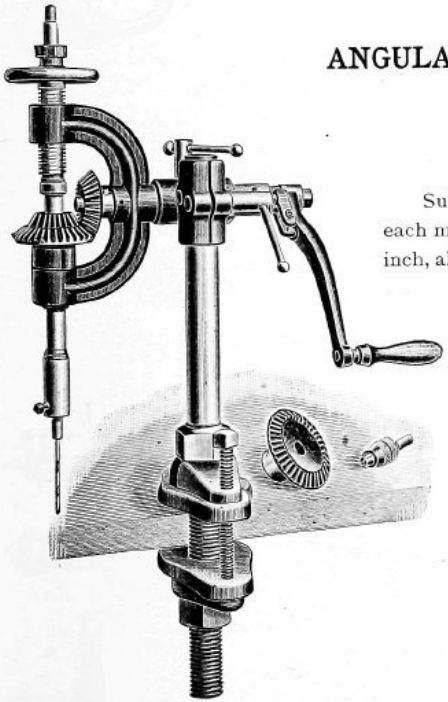
RAIL AND GIRDER HACK SAW.



This frame is furnished complete with one 12 inch blade. It is intended for cutting rails or girders where depth of back is an essential feature. It is 10¼ inches from blade to back.

Packed 1 in a box.....each, $2 00

ANGULAR AND RATCHET DRILLING MACHINES.



Suitable for drills with ½ inch shanks. With each machine we send as sample one such drill ¼ inch, also a chuck to hold drills smaller than ¼ inch.

No. 1. Speeded, weight 34 lbs., drills up to ⅜ inch hole.....$20 00

No. 2. With two sets of gears, making either speeded or geared back machine, weight 64 lbs., drills up to 1 inch hole..... 25 00

No. 3. Geared back, weight 108 lbs., drills up to 1½ inch hole..... 40 00

Made to order, with hole for taper socket, when required.

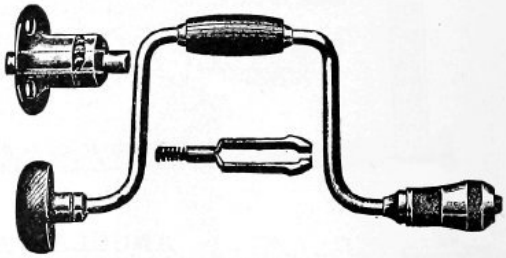
Extra, net.....$1 50

BRACES.

BARBER'S IMPROVED PATENT BRACES.

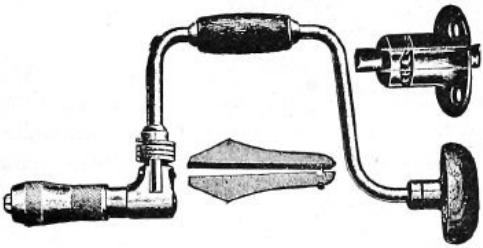
This Brace has the same style of Jaws as our best Steel Braces. The sweep is made of steel, tumbled and not polished; the head and revolving handle are of hard maple. It is a good serviceable Brace, and cheaper than any other brace of the same quality in market.

No.	71,	12	inch	sweep.....	per doz.,	$ 8 00
"	72,	10	"	"	" "	7 50
"	73,	8	"	"	" "	7 00
"	82,	10	"	" Ratchet.....	" "	14 00
"	83,	8	"	" "	" "	13 50



No.	40,	14	inch	sweep.....	per doz.,	$33 00
"	41,	12	"	"	" "	30 00
"	42,	10	"	"	" "	27 00
"	43,	8	"	"	" "	24 00
"	44,	6	"	"	" "	21 00

BARBER IMPROVED RATCHET BRACES.



This is the perfection of a Bit Brace, having a regular Barber Chuck, with forged steel jaws, and also Dolan's Patent Ratchet Attachment, to be used in places where there is not enough room to revolve the sweep. A slight back and forth motion will drive the bit in or out. All the working parts are made of steel, and the whole brace is beautifully finished.

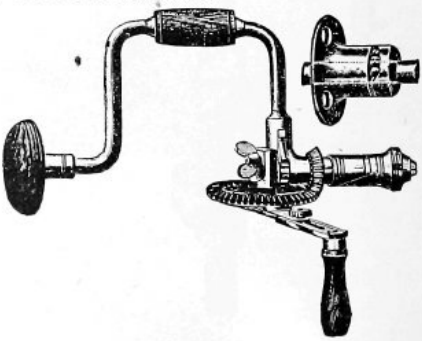
No.	30,	14	inch	sweep.....	per doz.,	$42 00
"	31,	12	"	"	" "	39 00
"	32,	10	"	"	" "	36 00
"	33,	8	"	"	" "	33 00
"	34,	6	"	"	" "	30 00

DRILL BRACE WITH BALL BEARINGS.

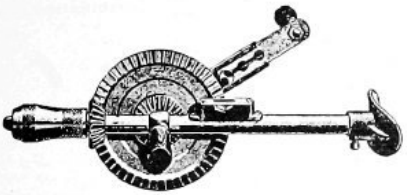
This is a ten-inch sweep ratchet brace, with gear wheels speeded about three to one, to be used for drilling When not needed the gear wheel can be removed in one second, leaving a ratchet brace. This brace is made of steel and heavily nickel plated, with rosewood handle and lignum-vitæ head. The jaws are of forged steel, and will center and hold firmly round twist drills from ⅛ to 7-16 of an incl. in diameter. Also square shank bits and drills of all sizes. Also square and flat screwdriver bits. In fact, it will hold perfectly tool shanks of any size or shape. There is no other chuck in existence which will do this.

With each drill brace we send an extra set of forged steel jaws, mainly to be used for holding round twist drills less than one-eighth of an inch in diameter. As will be noticed in the cut, the large gear wheel has an extension handle to give it more power when needed.

Price each.....$3 00.



BREAST DRILL No. 10.

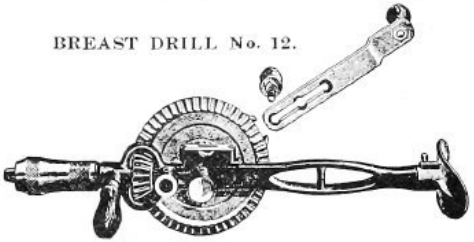


This Drill is made of round wrought iron, ⅜ of an inch in diameter. The handles are rosewood, the head malleable iron, and the chuck jaws of steel. It has a changeable gear, one even, and the other speeded three to one. The change from one to the other can be made in one second. The chuck will hold any shape shank, round, square or flat, as seen in the cut. These tools are not sold with the drill stock, but are only put in to show the shape of shank which the chuck will hold.

This Drill Stock is heavily nickel plated, and presents a very beautiful appearance. It would be very attractive in a show window. This Drill stock has cut gears. An extra set of steel jaws goes with each Drill stock, for holding small round drills.

Price, per dozen $36 00

BREAST DRILL No. 12.



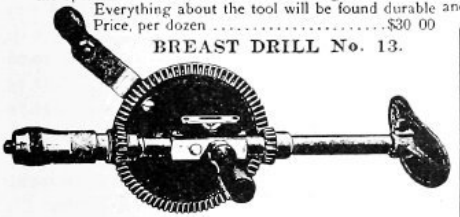
Adjustable gear from even, to speeded about 3 to 1.

This drill has been greatly improved recently As now made, this wheel is 5 inches in diameter The gears are cut from solid metal, and run almost absolutely perfect. A roller is placed at back of drive gear, which makes it equally as firm and substantial as a double geared drill. The crank is adjustable to three different lengths, and is held in place by a round head thumb screw with milled edges, which give the drill an attractive appearance. The drive gear is held by similar screw. The chuck is nickeled and has our new Alligator jaws suitable for both round and square shanks. The handles are cocobola. A new feature possessed by no other drill than those made by ourselves is the level attachment which enables the operator to see when the drill is being held true, and will be appreciated by good mechanics.

Everything about the tool will be found durable and nicely finished.

Price, per dozen $30 00

BREAST DRILL No. 13.



This is the largest sized drill in market, the drive-wheel being 6 inches in diameter, giving a speed of 4½ to 1. It is double-geared and most perfect in every part. It has Cut Gears, Steel Stock, Rosewood Handles, Steel Jawed Chuck, which will hold any size square and round tool shanks. It is heavily nickel plated, and really the most expensive Breast Drill in the market.

Price, per dozen $48 00

Both Drill Stocks on this page have extra steel jaws for holding small round drills.

AUTOMATIC DRILLING ATTACHMENT.

SELF-FEEDING—FOR USE IN BIT BRACE.

This tool will be recognized at once as one of the most useful on the market. It will do a great many jobs that would require much time and expense in taking down and putting back if done on a drill press. It is much superior to the breast drill, as it requires no pressure by the operator to make it cut. The chain does that part of the work. Holes up to ¾ inch can be drilled with ease, and with no danger of springing the brace with lever or other heavy pressure, often used by those not having one of these attachments. It will, in many cases, take the place of the ratchet drill, and can be adjusted ready for use in one-tenth part of the time. No carriage maker should be without one of these tools. It will pay for itself many times in a year, as there is scarcely any job of drilling on a carriage but can be done without removing the work. It is equally useful to pipers and plumbers—in fact, every man who has any occasion to drill holes in iron.

The Automatic Drilling Attachment is made in two styles, viz., No. 1, for Drills with ½-inch Round Shank; No. 2, with Universal Bit Brace Chuck.

PRICE LIST.

No. 1, without Drills	$5.00
No. 2, " "	6.25
Universal Chuck for Round and Square Shank Drills for No. 1	1.25
Solid Chuck for Square Shank Drills for No. 1	.60
Reducers for No. 1, four sizes, 3/16, 5/16, ¼ and 7/16, per set	.80
Extra Chains, per foot	.12

Keystone Ratchet.

Combination No. 200

Consists of....

Morse Taper Ratchet for Twist Drills,
Sleeve for Square Shank Drills, and
Short Boiler Socket for Square Shank Drills.

(Sockets interchangeable).

Combination No. 200.

PRICE LIST.

Combination complete, with 10-inch handle		$ 7.75
" " 14 " "		9.00
" " 16 " "		10.00
" " 18-22 " "		11.25
" " 24 " "		11.75
" " 28 " "		12.25

The Bore of Socket for 10-inch Ratchet is No. 2 Taper, taking Drills up to 29-32 of an inch.
" " 14 and 16 " " " 3 " " " 1¼ inches.
" " 18 to 28 " " " 4 " " " 3 "

The Socket for 10-inch Ratchet takes No. 1 Morse Taper Sleeve.
" 14 and 16 " " " 2 " " "
" 18 to 28 " " " 3 " " "

KEYSTONE RATCHET SOCKET WRENCHES.

Number of Wrench,		1	2	3	4	4	4	4
Length of Handle,	Inches,	10	14	16	20	22	24	28
Price with one Socket,	Each,	4.50	5.25	6.00	7.00	7.00	7.50	8.00
Extra Sockets,	"	1.00	1.25	1.50	2.00	2.00	2.00	2.00
Suitable for Nuts on Bolts up to	Inches,	⅝	⅞	1⅛	1¼	1¼	1½	2

Sockets are made to fit U. S. Standard size Nuts.

SCREW DRIVERS.

Size.....Inches	2	3	4	5	6	7	8	10	12
Per dozen.....	$1.50	2.00	2.50	3.00	3.50	4.00	4.75	6.00	8.00

EAGLE SCREW DRIVERS.

Blade	3 inches long,	3-16	inch diameter		Per dozen,	$ 3 00
"	4 " "	¼	" "		"	3 60
"	5 " "	¼	" "		"	4 20
"	6 " "	5-16	" "		"	4 80
"	7 " "	5-16	" "		"	5 90
"	8 " "	⅜	" "		"	6 50
"	10 " "	⅜	" "		"	8 00
"	12 " "	⅜	" "		"	10 00

IMPROVED SCREW DRIVERS.

STRICTLY HAND FORGED AND FULLY WARRANTED.

MACHINISTS' SCREW DRIVERS.

2½ inch	Per dozen,	$3 00	8 inch	Per dozen,	$ 8 00
3 "	"	3 50	9 "	"	9 00
4 "	"	4 25	10 "	"	10 00
5 "	"	5 00	11 "	"	11 00
6 "	"	6 00	12 "	"	12 00
7 "	"	7 00			

CABINET SCREW DRIVERS.

2½ inch	Per dozen,	$3 25	6½ inch	Per dozen,	$ 6 50
3½ "	"	3 50	8½ "	"	8 00
4½ "	"	4 50	10½ "	"	9 50
5½ "	"	5 50	12½ "	"	11 00

HERCULES SCREW DRIVERS.

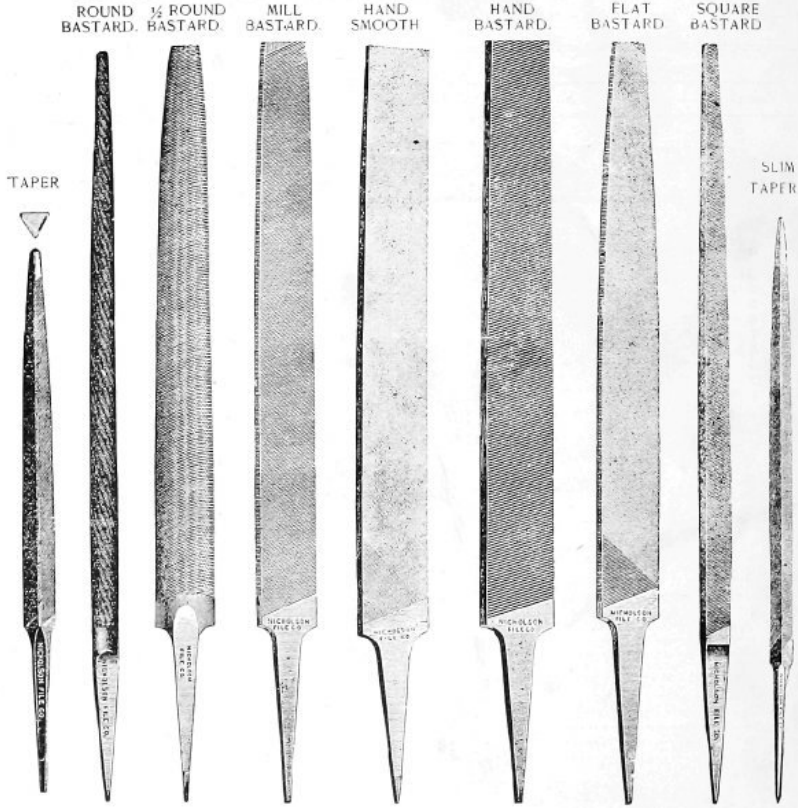
Length of Blade.....Inches	2	3	4	5	6	7	8	10	12
Per dozen.....	$3.00	3.00	3.00	3.50	4.00	5.00	5.50	8.50	9.50

Bicycle or Sewing Machine Screw Drivers, 4½ inches over all, per dozen, $3.00.

FILES.

"BLACK DIAMOND," "NICHOLSON," "J. BARTON SMITH."

PATENT INCREMENT CUT FILES AND RASPS



FLAT WOOD RASP.

PLAIN HORSE RASP.

FILES.

Price List of Patent Increment Cut Files and Rasps.

LIST OF NOV. 1, 1899. As Adopted by the File Manufacturers' Association of the United States, Nov. 1, 1899. PRICE PER DOZEN.

INCH.	MILL AND ROUND.			FLAT.		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	3.00	3.50	3.90	3.70	4.30	4.70
5	3.20	3.80	4.10	3.90	4.60	4.90
6	3.50	4.00	4.50	4.30	4.80	5.30
7	3.90	4.60	4.90	4.80	5.50	6.10
8	4.30	4.90	5.40	5.30	6.10	6.60
9	4.90	5.80	6.30	6.30	7.20	7.90
10	5.60	6.40	7.00	7.00	8.10	8.70
11	6.70	7.80	8.50	8.60	9.80	10.70
12	7.50	8.60	9.40	9.70	11.00	12.10
13	9.40	10.70	11.70	11.80	13.60	14.70
14	10.70	12.20	13.10	13.30	15.30	16.70
15	13.10	15.00	16.10	16.00	18.30	20.00
16	14.70	16.80	17.90	17.80	20.10	22.30
17	18.20	20.20	21.70	21.50	24.20	26.50
18	20.20	22.70	24.30	23.90	26.80	29.20
19	24.60	27.50	29.40	28.40	31.60	34.60
20	27.40	30.70	32.90	31.50	35.30	38.30

Mill Blunt, Dbl. Cut, adv. 2 in.
Mill Dbl. Cut, " 1 "
Mill Narrow Point, " 1 "
Mill Machine, " 1 "
Mill Triangular & Sq " 1 "
Farmers' Cut, adv. on Bast. 1 "

Cant (Blunt) Dbl. Cut advance 2 in.

INCH.	SQUARE.			HAND AND PILLAR.		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	3.80	4.60	4.90	3.70	4.30	4.80
5	4.10	4.80	5.30	3.90	4.70	5.30
6	4.60	5.10	5.50	4.30	5.10	5.60
7	5.10	5.80	6.30	4.90	5.80	6.30
8	5.50	6.30	7.00	5.40	6.30	6.70
9	6.60	7.70	8.30	6.70	7.80	8.30
10	7.40	8.50	9.10	7.50	8.70	9.40
11	9.10	10.40	11.30	9.40	10.90	11.80
12	10.20	11.50	12.80	10.70	12.30	13.50
13	12.50	14.30	15.40	13.30	15.20	16.20
14	13.90	16.10	17.50	15.00	17.00	18.20
15	16.90	19.20	20.90	17.90	20.60	21.70
16	18.70	21.20	23.30	20.10	22.80	24.20
17	22.50	25.40	27.50	24.20	27.10	28.60
18	25.10	28.20	30.40	26.80	29.90	31.50
19	29.70	33.20	35.70	31.90	35.40	37.60
20	32.80	36.70	39.30	35.10	39.20	41.60

Square Blunt, advance 1 in.

Slotting (Bit.) adv. 2 in.
Cotter Blunt or Taper advance 2 in.
Reaper, advance 1 in. on 2d Cut.

INCH.	HLF. RD. & THREE SQ.			WARDING.		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	4.80	5.60	6.10	4.00	4.80	5.40
5	5.40	6.10	6.40	4.50	5.30	5.80
6	6.10	6.70	7.10	4.90	5.90	6.40
7	7.00	7.70	8.20	5.90	6.90	7.50
8	7.50	8.30	8.90	6.40	7.50	8.20
9	8.50	9.40	9.90	7.80	9.00	9.90
10	9.10	10.10	10.70	8.70	10.10	11.00
11	10.70	11.80	12.70	10.90	12.70	13.70
12	11.80	13.00	13.90	12.30	14.30	15.40
13	14.10	15.40	16.60	15.20	17.40	18.70
14	15.50	17.00	18.30	17.00	19.40	21.00
15	18.50	20.40	21.70			
16	20.60	22.50	24.20			
17	24.70	27.00	28.90			
18	27.50	29.90	32.00			
19	32.80	35.70	38.10			
20	36.20	39.40	42.30			

Ginsaw, take Bastard price.
Crossing, " adv. 2 in.
Tumbler, " 2 "
Feather Edge (Blunt) " 2 "
High Back " 2 "
Half Round " 2 "

Stavesaw.

8 inch,	$9.40

Stavesaw Improved.

6 inch,	$6.40
7 "	7.40
8 "	8.10
9 "	9.70
10 "	10.70
12 "	15.40

INCH.	MILL. ONE ROUND EDGE.			MILL. TWO ROUND EDGES.		
	Bastard	2d Cut	Smooth	Bastard	2d Cut	Smooth
4	3.40	3.90	4.40	3.80	4.40	4.90
5	3.60	4.30	4.60	4.00	4.80	5.10
6	3.90	4.50	5.10	4.40	5.00	5.60
7	4.40	5.20	5.50	4.90	5.80	6.10
8	4.80	5.50	6.10	5.40	6.10	6.80
9	5.50	6.50	7.10	6.10	7.30	7.90
10	6.30	7.20	7.90	7.00	8.00	8.80
11	7.50	8.80	9.60	8.40	9.80	10.60
12	8.40	9.70	10.60	9.40	10.80	11.80
13	10.60	12.00	13.20	11.80	13.40	14.60
14	12.00	13.70	14.70	13.40	15.30	16.40
15	14.70	16.90	18.10	16.40	18.80	20.10
16	16.50	18.90	20.10	18.40	21.00	22.40
17	20.50	22.70	24.40	22.80	25.30	27.10
18	22.70	25.50	27.30	25.30	28.40	30.40

INCH.	TAPERS.		SLIM TAPERS.		BANDSAW. BLUNT & TAPER.	
	Single Cut	Double Cut	Single Cut	Double Cut	Regular	Slim
3	2.10	2.50	2.10	2.50	2.50	2.50
3½	2.10	2.50	2.10	2.50	2.50	2.50
4	2.20	2.90	2.20	2.60	2.90	2.60
4½	2.40	3.10	2.30	3.00	3.10	3.00
5	2.60	3.50	2.50	3.20	3.50	3.20
5½	3.00	4.00	2.90	3.50	4.00	3.50
6	3.40	4.70	3.10	3.90	4.70	3.90
7	4.30	5.60	3.80	4.50	5.60	4.50
8	5.40	6.70	4.50	5.30	6.70	5.30
9	6.60	8.10	5.40	6.30	8.10	6.30
10	8.10	9.70	6.40	7.50	9.70	7.50
11	10.70	12.10	8.30	9.10	12.10	9.10
12	12.50	14.70	9.50	11.00	14.70	11.00
13	15.90	17.50	12.10	13.10	17.50	13.10
14	18.20	20.60	13.80	15.40	20.60	15.40

INCH.	PIT SAW.	CANT SAW.	CROSS CUT.	HOOK TOOTH.	Planer Knife.	Inserted Tooth, or Chisel Tooth
	Single Cut	Single Cut	Single Cut	Single Cut	Single Cut	
4	4.80	4.30	4.80	.....	.....	.....
5	5.40	4.70	5.40	.....	.....	.....
6	6.10	5.10	6.10	6.70	.....	.....
7	7.00	6.10	7.00	7.70	.....	.....
8	7.50	6.40	7.50	8.30	6.40	8.30
9	8.50	7.80	8.50	9.40	.....	9.40
10	9.10	8.70	9.10	10.10	8.60	10.10
11	10.70	10.40	10.70	11.80	.....	.....
12	11.80	11.40	11.80	13.00	12.10	.....

Climax, adv. 2 in. on Hlf. Rd. Bastard.
Round Gulleting, take Pitsaw price.

PATENT DOUBLE-ENDER WITH HANDLE.

The Name	7	8	9	10	Is Our Trade Mark.
Double-Ender	3.50	3.90	4.40	4.90	

INCH.	HORSE RASPS.			FILE RASPS.		
	Plain	Beveled 2½ Rasp	Tanged	Flat	Hf. Rnd	
6	.....	.....	.....	7.40	8.10	6
7	.....	.....	.....	8.60	9.30	7
8	.....	.....	.....	9.40	10.10	8
9	.....	.....	.....	11.40	12.20	9
10	9.40	10.70	12.80	12.80	13.70	10
11	11.40	12.90	15.20	15.50	16.80	11
12	12.80	14.40	16.80	17.50	18.70	12
13	15.20	17.00	19.60	20.90	22.40	13
14	17.80	20.10	23.10	23.20	24.80	14
15	20.90	23.60	27.30	27.80	29.70	15
16	24.40	27.50	32.20	30.80	32.90	16
17	28.90	31.50	.....	36.20	38.90	17
18	32.90	36.20	.....	40.00	43.60	18

INCH.	WOOD FILES.			WOOD RASPS.		
	Flat	Hf. Rnd	Cabinet	Flat	Hf. Rnd	Cabinet
4	4.30	6.10	8.10	7.40	8.10	10.10
5	4.80	7.00	9.30	8.60	9.30	11.70
6	5.30	7.50	10.10	9.40	10.10	12.80
7	6.30	8.50	12.20	11.40	12.20	15.50
8	7.00	9.10	13.70	12.80	13.70	17.50
9	8.60	10.70	16.80	15.50	16.80	20.70
10	9.70	11.80	18.70	17.50	18.70	22.80
11	11.80	14.10	22.40	20.90	22.40	26.80
12	13.30	15.50	24.80	23.20	24.80	29.60
13	15.50	18.50	29.70	27.80	29.70	33.90
14	17.80	20.60	32.90	30.80	32.90	36.90
15	21.50	24.70	38.90	36.20	38.90	42.40
16	23.90	27.50	43.60	40.90	43.60	46.90

INCH.	SHOE RASPS.			INCH.	KNIFE.		
	Flat	Hf. Rnd	Oval		Bastard	2d Cut	Smooth
6	8.10	8.10	9.30	4	5.40	6.10	6.40
7	9.30	9.30	10.10	5	6.10	6.70	7.10
8	10.10	10.10	12.20	6	6.90	7.50	7.90
9	12.20	12.20	13.70	7	7.80	8.50	8.90
10	13.70	13.70	16.80	8	8.50	9.10	9.50
11	16.80	16.80	18.70	9	9.40	10.60	11.30
12	18.70	18.70	22.40	10	10.10	11.50	12.30
13	22.40	22.40	.....	11	12.20	13.70	14.60
14	24.80	24.80	.....	12	13.70	15.20	16.10
				13	16.30	17.90	19.20
				14	18.20	19.90	21.20

LAST MAKERS' RASPS.
One inch adv. on Cabinet Rasp.

Sizes below 4 inches, not extended, take 4 inch price.
Half Inches not specified, take next higher full inch price.
Dead Smooth, double the price of Bastard Cut.
One Round Edge, advance 12½ per cent.
All lengths above those listed, advance 20 per cent. on next lower inch price.
Cute not specified, made upon regular blanks, advance one inch on respective kinds and nearest cut.

Blunts Files not specified, advance one inch on respective kinds and cuts.
Single or Float Cut not specified, on regular shapes take Double Cut prices.
Equalings (Bolled), advance two inches on respective kinds and cuts.
Two Round Edges, advance 25 per cent.
Files varying from standard sizes, subject to special prices.

SOCKET CHISELS.

SOCKET FIRMER.

These chisels are made from the finest tool steel, have leather tipped handles; are sharp and ready for use

Straight Edge.

Bevel Edge.

6-INCH BLADE.

Size, inches	⅛	¼	⅜	½
Price per dozen	$ 8.00	$ 8 00	$ 8 00	$ 9 00
Size, inches	⅝	¾	⅞	1
Price per dozen	10.00	11 00	11 00	12 00
Size, inches	1¼	1½	1¾	2
Price per dozen	13.00	14 00	15.00	16 00
Add to above for beveled edges net, per dozen				75

SOCKET CHISELS.

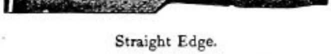
SOCKET FIRMER.

Same as above, in sets of 12, packed in wooden box.

One each from ⅛ inch to 2 inches. Price per set $17 00

SOCKET FRAMING CHISELS.

These chisels are made from the finest tool steel, have leather tipped handles; are sharp ready for use.



Straight Edge.

Bevel Back.

8-INCH BLADE.

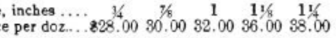
Size, inches	¼	5/16	⅜	7/16	½
Price per dozen	$12.00	$12.00	$12.00	$12.00	$12 00
Size, inches	⅝	¾	⅞	1	1⅛
Price per dozen	13.00	14.00	15.00	16.00	18.00
Size, inches		1¼	1½	1¾	2
Price per dozen		18.00	20 00	22.00	24.00
Size, inches		2¼	2½	2¾	3
Price per dozen		28.00	32 00	36 00	40.00
Add for bevel back, per dozen					

SOCKET FRAMING CHISELS.

In sets of 12, packed in wooden box.

One each from ¼ inch to 2 inches. Price per set. $18.00

SOCKET CORNER CHISELS.



Size, inches	¼	⅞	1	1⅛	1¼	1½
Price per doz.	$28.00	30.00	32.00	36.00	38.00	40.00

CARPENTERS' SOCKET SLICKS.

Size, inches	2½	3	3¼	3½	4
Price per dozen	$40 00	$44 00	$48.00	$52.00	$60 00

SOCKET FIRMER GOUGES.

Solid cast steel, outside bevel, 6-inch blade.

Size, inches	⅛	¼	⅜	½	⅝
Price per dozen	$5.00	$5 75	$ 6 00	$ 7 00	$ 8 00
Size, inches	¾	⅞	1	1¼	1½
Price per dozen	8.50	9.00	9 50	10.50	11 50
Size, inches		1¾	2	2½	3
Price per dozen		12.00	13.00	20 00	26.00

SOCKET FIRMER GOUGES.

In sets of 12, packed in wooden box.

One **each, ¼ inch** to 2 **inches**. Price per set $12.00

DRAW KNIVES.

Made from the best cast steel, heavy ferrules and capped handles.

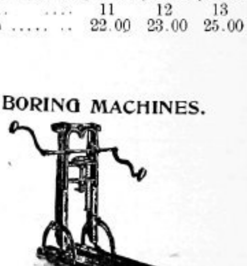
CARPENTERS' KNIVES.

Size, inches	6	7	8	9	10	11
Price per doz.	$16 00	17 00	18.00	19.00	20.00	21.00
Size, inches		12	13	14	15	16
Price per dozen		22.00	24.00	25.00	26 00	28.00

RAZOR BACK KNIVES.

Size, inches	6	7	8	9	10
Price per dozen	$17 00	$18.00	$19.00	$20.00	$21.00
Size, inches		11	12	13	14
Price per dozen		22.00	23.00	25.00	26.00

BORING MACHINES.



No. 5. Upright without augers $6.25
No. 5. Upright with 1, 1½ and 2 inch cast steel augers 8.50
No. 2. Angular without augers 7.00
No. 2. Angular with 1, 1½ and 2 inch cast steel augers 9.25

SHIP AUGERS.

With or without Screw.

Size, Inches, 16ths.	Twist, inches.	Price per Dozen.	Size, inches, 16ths.	Twist, inches.	Price per Dozen.
4 to 8	7½ to 9½	$ 7.50	37 and 38	15	$ 86.00
9 and 10	12	9.00	39 " 40	15	101.00
11 " 12	12	10.50	41 " 42	15	115.00
13 " 14	12	12.00	43 " 44	15	130.00
15 " 16	12	13.50	45 " 46	15	144.00
17 " 18	12	15.00	47 " 48	15	158.00
19 " 20	15	16.50	49 " 50	15	173.00
21 " 22	15	18.00	51 " 52	15	187.00
23 " 24	15	21.00	53 " 54	15	201.00
25 " 26	15	24.00	55 " 56	15	216.00
27 " 28	15	25.50	57 " 58	15	231.00
29 " 30	15	31.50	59 " 60	15	245.00
31 " 32	15	33.00	61 " 62	15	260.00
33 " 34	15	57.00	63 " 64	15	274.00
35 " 36	15	72.00	71 " 72	15	332.00

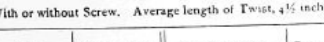
SHIP AUGERS.

With extra length of Twist.

Price per Dozen.

Size, inches. 16ths.	TWIST, INCHES.					
	18	20	22	24	30	36
8 and under	$ 9.60	$11.52	$13.44	$15.63	$17.28	$19.20
9	10.80	12.96	15.12	17.28	19.44	21.60
10	12.00	14.40	16.80	19.20	21.60	24.00
11	13.20	15.84	18.48	21.12	23.76	26.40
12	14.40	17.28	20.16	23.04	25.92	28.80
13	15.60	18.72	21.84	24.96	28.08	31.20
14	16.80	20.16	23.52	26.88	30.24	33.60
15	18.00	21.60	25.20	28.80	32.40	36.00
16	19.20	23.04	26.88	30.72	34.56	38.40
17	20.40	24.48	28.56	32.64	36.72	40.80
18	21.60	25.92	30.24	34.56	38.88	43.20
19	22.80	27.36	31.92	36.48	41.04	45.60
20	24.00	28.80	33.60	38.40	43.20	48.00
21	25.20	30.24	35.28	40.32	45.36	50.40
22	26.40	31.68	36.96	42.24	47.52	52.80
23	27.60	33.12	38.64	44.16	49.69	55.20
24	28.80	34.56	40.32	46.08	51.84	57.60
25	30.00	36.00	42.00	48.00	54.00	60.00
26	31.20	37.44	43.68	49.92	56.16	62.40
27	32.40	38.88	45.36	51.84	58.32	64.80
28	33.60	40.32	47.04	53.76	60.48	67.20
29	39.80	46.76	53.72	60.68	67.64	74.60
30	41.00	48.20	55.40	62.60	69.80	77.00
31	44.20	51.64	59.08	66.52	73.96	81.40
32	45.40	53.08	60.76	68.44	76.12	84.80

SHIP AUGER BITS.



With or without Screw. Average length of Twist, 4½ inches

Size, inches.	Price, Doz	Size, inches.	Price, Doz
½ and under	$ 6.00	15/16 and 16/16	$12.00
9/16 " 10/16	7.50	17/16 and 18/16	13.00
11/16 " 12/16	9.00	19/16 and 20/16	15.50
13/16 " 14/16	10.50		

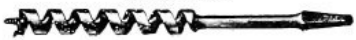
SHIP AUGER PATTERN CAR BITS.

With or without Screws. 12 inch Twist.

Size in 16ths.	Price, Dozen.	Size in 16ths.	Price, Dozen.
4	$ 8 50	18	$16 00
5	8 50	19	17 00
6	9 00	20	17 50
7	9 50	21	18 50
8	10 00	22	19 00
9	10.50	23	21 50
10	11 00	24	22 00
11	11 50	25	25 00
12	12 00	26	25 50
13	12 50	27	26 00
14	13 00	28	26 50
15	14 00	29	27 50
16	14.50	30	28 00
17	15 50		

SINGLE TWIST SHIP AUGERS.

Extension Lip.



Specially adapted for hardwood and end boring. Solid cast steel, full polished.

Size in 16ths	Price, Dozen	Size in 16ths.	Price, Dozen.
3	$ 6 00	10	$ 7 50
4	6 00	11	9 00
5	6 00	12	9 00
6	6 00	13	10 50
7	6 00	14	10 50
8	6 00	15	12 00
9	7 50	16	12 00

RAFTING SHIP AUGERS.

With or without Screw.

Size in 16ths.	Price, Dozen.	Size in 16ths.	Price, Dozen.
8	$ 8 25	31-32	$ 34 65
9-10	9 90	33-34	52 80
11-12	11 55	35-36	66 00
13-14	13 20	37-38	79 20
15-16	14 85	39-40	92 40
17-18	16 50	41-42	105 60
19-20	18 15	43-44	118 80
21-22	19 80	45-46	132 00
23-24	23 10	47-48	145 20
25-26	26 40	50-60	224 40
27-28	28 05	71-72	303 60
29-30	29 70		

SHIP AUGER BORING MACHINE AUGERS.

Size, inches	Price, Dozen	Size, inches	Price, Dozen.
½	$ 8 25	1⅛	$16 50
⅝	10 00	1¼	18 20
¾	11 50	1½	23 10
⅞	13 25	1¾	28 00
1	15 00	2	34 50

CAST STEEL AUGER BITS.

Warranted.

In wooden boxes.

Solid cast steel, polished.

Size, inches, 16ths.	3	4	5	6	7	8
Price per dozen	$4.00	3.50	3.50	3.75	3.75	4.00
Size, inches, 16ths		9	10	11	12	13
Price per dozen		$4.25	4.50	5.00	5.50	6.00
Size, inches, 16ths		14	15	16	17	18
Price per dozen		$6.50	7.25	8.00	9.00	10.00
Size, inches, 16ths		19	20	21	22	23
Price per dozen		$10.50	11.00	11.50	12.00	13.00

Sets of 18 quarters, $3.25 Sets of 24 quarters, $4.25

Sets of 32 1/2 quarters, $5.75

JENNINGS' PATTERN AUGER BITS.

Extension Lip.

In wooden boxes.

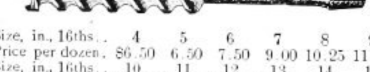
Solid cast steel, full polished.

Size, inches, 16ths	3	4	5	6	7
Price per dozen	$3.40	3.00	3.40	3.80	4.40
Size, inches, 16ths	8	9	10	11	12
Price per dozen	$4.80	5.20	5.60	6.10	6.60
Size, inches, 16ths	13	14	15	16	17
Price per dozen	$7.20	7.80	8.40	9.00	9.60
Size, inches, 16ths	18	19	20	22	24
Price per dozen	$10.20	10.80	11.40	12.60	13.80

CAST STEEL CAR BITS.

12-inch Twist.

In wooden boxes.

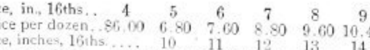


Size, in., 16ths	4	5	6	7	8	9
Price per dozen	$6.50	6.50	7.50	9.00	10.25	11.25
Size, in., 16ths	10	11	12	13	14	15
Price per dozen	$12.75	13.25	15.50	16.50	17.75	18.75
Size, in., 16ths			16	17	18	20
Price per dozen			$20.50	24.00	27.00	30.00

JENNINGS' PATTERN CAR BITS.

Extension Lip. 12-inch Twist.

In wooden boxes.



Size, in., 16ths	4	5	6	7	8	9
Price per dozen	$6.00	6.80	7.60	8.80	9.60	10.40
Size, inches, 16ths		10	11	12	13	14
Price per dozen		$11.20	12.20	13.20	14.40	15.60
Size, inches, 16ths		15	16	17	18	19
Price per dozen		$16.80	18.00	19.20	20.40	21.60
Size, inches, 16ths		20	21	22	23	24
Price per dozen		$22.80	24.00	25.20	26.40	27.60

CAST STEEL NUT AUGERS.

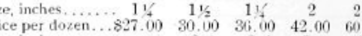
Size, inches	3/8	1/2	5/8	3/4	7/8
Price per dozen	$6.00	6.00	7.00	8.00	9.00
Size, inches	1	1 1/8	1 1/4	1 1/2	1 3/4
Price per dozen	$10.00	11.00	12.00	15.00	18.00
Size, inches	2	2 1/4	2 1/2	2 3/4	3
Price per dozen	$22.00	40.00	50.00	60.00	70.00
Size, inches		3 1/4	3 1/2	3 3/4	4
Price per dozen		$80.00	90.00	100.00	120.00

CAST STEEL BORING MACHINE AUGERS.

Size, inches	1/4	3/8	1/2	5/8	3/4
Price per dozen	$10.00	10.00	10.00	10.00	10.00
Size, inches	7/8	1	1 1/8	1 1/4	1 3/8
Price per dozen	$10.00	12.00	13.00	14.00	16.00
Size, inches			1 1/2	1 3/4	2
Price per dozen			$17.00	20.00	24.00

CAST STEEL RAFTING AUGERS.

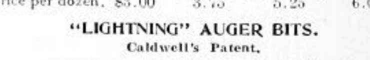
12 to 14-inch Twist.



Size, inches	1 1/4	1 1/2	1 3/4	2	2 1/4
Price per dozen	$27.00	30.00	36.00	42.00	60.00
Size, inches		2 1/2	2 3/4	3	4
Price per dozen		$70.00	85.00	100.00	140.00

CLARK'S EXPANSIVE BITS.

With Two Cutters.



	Small.	Large.
Cuts, inches	1/2 to 1 1/2	7/8 to 3
Price per dozen	$18.00	26.00

EXTRA CUTTERS.

No.	1	2	3	4
Cut, inches	1/2 to 7/8	7/8 to 1 1/2	7/8 to 1 3/4	1 3/4 to 3
Price per dozen.	$3.00	3.75	5.25	6.00

"LIGHTNING" AUGER BITS.

Caldwell's Patent.

The worm has a double thread, terminating in two cutting points. The double thread with the specially formed twist secures its double quick work without increase of power . Made of special steel. High quality and finish.

Size, inches	3	4	5	6	7	8
Price per dozen	$3.40	3.00	3.40	3.80	4.40	4.80
Size, inches		9	10	11	12	13
Price per dozen		$5.20	5.60	6.10	6.60	7.20
Size, inches		14	15	16	18	20-16
Price per dozen		$7.80	8.40	9.00	10.20	11.40

Put up in slide cover wooden boxes, one-half doz. in box,

HIGH SPEED MACHINE AUGER BITS.

Fast Feed, Good Clearance, Superior Steel. Money Savers.

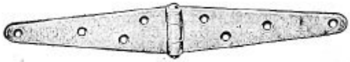
High Speed Machine Auger Bit for Car Work.

Size.	Twist 2 to 6 in.		Twist 6 to 9 in.		Twist 9 to 12 in.		Twist 12 to 15 in.		Twist 15 to 18 in	
	Dozen.	Each.	Dozen.	Each.	Dozen.	Each.	Dozen.	Each.	Dozen.	Each.
5-16	$ 6 50	$0 60	$ 7 15	$0 65	$ 7 80	$0 75	$ 8 50	$0 80	$ 9 10	$0 85
6-16	7 00	65	7 70	75	8 40	80	9 10	85	9 80	90
7-16	8 25	75	9 10	85	9 90	90	10 70	1 00	11 60	1 05
8-16	9 50	85	10 50	95	11 40	1 05	12 40	1 10	13 30	1 20
9-16	10 50	95	11 50	1 05	12 60	1 15	13 70	1 25	14 70	1 35
10-16	11 50	1 05	12 65	1 15	13 80	1 25	15 00	1 35	16 10	1 50
11-16	12 50	1 15	13 75	1 25	15 00	1 35	16 25	1 50	17 50	1 60
12-16	14 00	1 25	15 40	1 40	16 80	1 50	18 20	1 65	19 60	1 75
13-16	15 50	1 40	17 00	1 55	18 60	1 65	20 20	1 80	21 70	1 95
14-16	16 75	1 50	18 50	1 65	20 10	1 80	21 80	1 95	23 50	2 10
15-16	18 00	1 60	19 80	1 75	21 60	1 95	23 40	2 10	25 20	2 25
16-16	19 50	1 70	21 50	1 90	23 40	2 10	25 40	2 20	27 30	2 40
17-16	21 00	1 85	23 10	2 05	25 20	2 25	27 30	2 40	29 40	2 60
18-16	22 50	2 00	24 75	2 20	27 00	2 35	29 25	2 60	31 50	2 75
19-16	24 00	2 10	26 40	2 30	28 80	2 50	31 20	2 75	33 60	2 95
20-16	25 50	2 25	28 00	2 50	30 60	2 70	33 20	2 95	35 70	3 15
21-16	27 00	2 35	29 70	2 60	32 40	2 85	35 20	3 05	37 80	3 30
22-16	28 50	2 50	31 40	2 75	34 20	3 00	37 00	3 25	40 00	3 50
23-16	30 00	2 60	33 00	2 85	36 00	3 15	39 00	3 35	42 00	3 60
24-16	31 50	2 75	34 70	3 00	37 80	3 30	41 00	3 60	44 10	3 85
25-16	33 00	2 85	36 30	3 15	39 60	3 40	43 00	3 70	46 20	4 00
26-16	34 50	3 00	38 00	3 30	41 40	3 60	45 00	3 90	48 30	4 20
27-16	36 00	3 10	39 60	3 40	43 20	3 75	46 80	4 05	50 40	4 35
28-16	37 50	3 25	41 25	3 55	45 00	3 90	48 75	4 25	52 50	4 55
29-16	39 00	3 35	43 00	3 70	46 80	4 05	50 70	4 40	54 60	4 70
30-16	40 50	3 50	44 50	3 85	48 60	4 20	52 70	4 55	56 70	4 90
31-16	42 00	3 60	46 25	4 00	50 40	4 35	54 60	4 70	58 80	5 05
32-16	43 50	3 75	48 00	4 15	52 20	4 50	56 60	4 90	61 00	5 25

Single Twist Machine Bit of Ship Auger Pattern, with or without Screw.
For Pneumatic or Machine Borers.

Furnished in any length of twist. Prices upon application.

LIGHT STEEL STRAP HINGES.

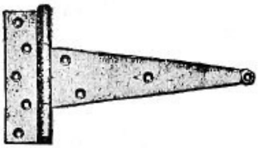


Inches	3	4	5	6	7	8	10
No. of screw	6	7	8	9	10	10	10
Per dozen pairs	$1.35	$1.80	$2.20	$2.85	$3.45	$4.00	$5.50

HEAVY STEEL STRAP HINGES.

Inches	4	5	6	8	10	12	14
Weight doz. pairs, lbs.	6½	10	18½	32	54	76	85
No. of screw	9	9	11	12	13	14	16
Per dozen pairs	$2.45	3.30	.....	.....	.....	.....	.....
Per pound	.....	.....	$0.23	.21	.20	.20	.20

LIGHT STEEL "T" HINGES.



Inches	3	4	5	6	8	10
Weight doz. pairs, lbs.	2¾	3¾	5	6	9½	13
Size of screw	7	8	8	9	10	11
Per dozen pairs	$1.15	$1.25	$1.55	$1.85	$2.35	$3.45

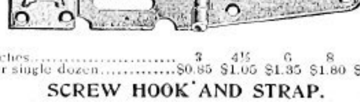
HEAVY STEEL "T" HINGES.

Inches	4	5	6	8	10
Weight dozen pairs, lbs.	5	6¼	8¾	12	18½
Size of screw	8	9	10	11	11
Per dozen pairs	$1.95	$2.25	$2.70	$3.40	$5.00

EXTRA HEAVY STEEL "T" HINGES.

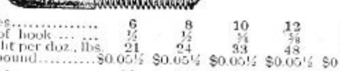
Inches	4	5	6	8	10	12
Weight doz. pairs, lbs.	8	14	21	35	55	78
Size of screw	10	11	12	13	16	17
Per dozen pairs	$3.00	$3.85	.....	.....	.....	.....
Per pound	.....	.....	$0.24	$0.23	$0.21	$0.21

HINGE HASPS (Wrought Iron)



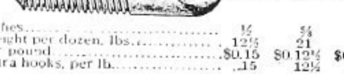
Inches	3	4½	6	8	10
Per single dozen	$0.85	$1.05	$1.35	$1.80	$2.00

SCREW HOOK AND STRAP.



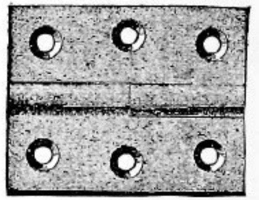
Inches	6	8	10	12	14
Size of hook	½	½	⅝	⅝	¾
Weight per doz., lbs.	21	24	33	48	70
Per pound	$0.05½	$0.05½	$0.05½	$0.05½	$0.05
Inches	16	18	20	22	24
Size of hook	¾	¾	⅞	⅞	⅞
Weight per doz., lbs.	74	90	96	126	132
Per pound	$0.05	$0.05	$0.05	$0.04½	$0.04½

HOOK AND EYE.



Inches	½	⅝	¾
Weight per dozen, lbs.	12½	21	40
Per pound	$0.15	$0.12½	$0.10
Extra hooks, per lb.	.15	12½	.10

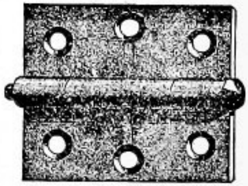
CAST LOOSE JOINT BUTTS.



Plain, without Tips.

Inches	2x2	2½x2½	3x2½*	3x3
Size of screw	8	8	10	10
Per dozen pairs	$1.00	$1.35	$1.60	$1.75
Inches	3½x3½	4x4	4½x4½	5x5
Size of screw	10	11	11	13
Per dozen pairs	$2.35	$2.90	$4.00	$5.50

WROUGHT STEEL LOOSE PIN BUTTS.



Polished, Reversible.

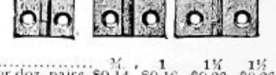
Inches	2x2	2½x2½	2½x2	2½x2½	2½x3
Size of screw	8	8	9	9	9
Per dozen pairs	$1.40	$1.50	$1.60	$1.80	$2.20
Inches	3x2½	3x3	3x3½	3½x3	3½x3½
Size of screw	10	10	10	11	11
Per dozen pairs	$2.40	$2.60	$3.00	$3.60	$3.80
Inches	3½x4	4x3½	4x4	4x4½	5x5
Size of screw	11	11	11	12	13
Per dozen pairs	$4.20	$4.60	$4.70	$5.90	$7.70

Light, Polished, Reversible.

Inches	2x2	2½x2½	2½x3
Size screw	7	7	7
Per dozen pairs	$1.40	$1.80	$2.20

WROUGHT BRASS BUTTS.

NARROW. MIDDLE. BROAD.



Inches	¾	1	1¼	1½	1¾
Narrow, per doz. pairs,	$0.14	$0.16	$0.23	$0.26	$0.34
Middle, " "	.15	.19	.24	.30	.38
Broad, " "	.....	.20	.27	.34	.42
Inches	2	2¼	2½	2¾	3
Narrow, per doz. pairs,	$0.40	$0.56	$0.70	$1.00	$1.25
Middle, " "	.46	.65	.85	1.15	1.50
Broad, " "	.52	75	1.00	1.30	1.75

DOOR HANGERS.

Run Easy* Warehouse Hangers, Heavy Steel, Anti-Friction, with Self-Locking Loose Axles.

PER DOZEN PAIRS.

No. 600—Warehouse, 6 in. Wheel, 14 foot Run, 1¼ x 5/16 in. Strap, Weight per dozen pairs, 400 lbs., . . $54.00

No. 700—Warehouse, 7 in. Wheel, 16 foot Run, 2 x 5/16 in. Strap, Weight per dozen pairs, 530 lbs., . . 72.00

One-quarter Dozen Pairs in a Case.

Our No. 700 is the strongest and heaviest Warehouse or Barn Door Hanger made.

PER FOOT.

No. W—Warehouse Rail, Flat Steel, **2 x 5/16 in.,** (without Brackets or Lag Screws), **in 6, 8 and 10 foot Lengths,** $0.18

Packed Regularly 10 Pieces in a Bundle; Weight per 100 Feet, 215 lbs.

A 2 x 4 in. Header should be used and the Rail should be secured to it by ⅝ in. Lag Screws.

BARN DOOR HANGERS.

Lane's Standard, Steel Covered, Anti-Friction.

PER DOZEN PAIRS

No. 11 — 5 foot Run, Weight per dozen pairs, 100 lbs., . . $15.00

No. 11½—10 foot Run, Weight per dozen pairs, 122 lbs., . . 18.00

No. 12 —10 foot Run, Weight per dozen pairs, 174 lbs., ... 22.00

BARN DOOR STAYS.

PER SINGLE DOZEN.

No. 2—Screw, Japanned, $1.50

Packed Loose.

PER SINGLE DOZEN.

No. 3—Adjustable, entirely of Steel, except the Wheel, $2.00

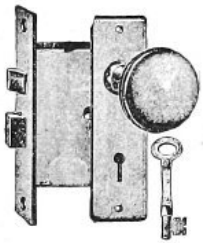
One Dozen in a Case.

MORTISE LOCK SETS.

INSIDE DOOR.

★ CROWN.

WROUGHT BRONZE AND WROUGHT STEEL.



Per Dozen Sets

★ **No. 621—Lock** No. 1081, 3¼ x 3⅜ inch, steel case, wrought bronze face and strike, bronze bolts, nickel plated steel Key, 1 tumbler, wrought bronze Knob No. 52½, 2¼ inch, wrought bronze Escutcheons No. 3B, 5½ x 1⅛ inch. **Plain Bronze**..... $14.00

★ **No. 621 x 22½ Finish**—Same as No. 621, except polished **Old Copper,** medium shade 15.00

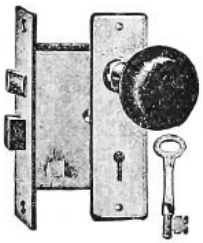
★ **No. 621 x A22½ Finish**—Same as No. 621, except **Sand Blast Copper,** medium shade 16.00

Twelfth dozen sets in a box, with screws; five dozen sets in a case; weight per case, 125 lbs.

★ **No. N620—Lock** No. 1099, 3¼ x 3⅜ inch, steel case, face and strike, iron bolts, nickel plated steel Key, 1 tumbler, Steel Knob No. 53S, 2¼ inch, Steel Escutcheons No. 3S, 5½ x 1½ inch. **Nubian Bronzed**..... 10.00

★ **No. R620**—Same as No. N620, except **Roman Bronzed** 11.00

Quarter dozen sets in a box, with screws; five dozen sets in a case; weight per case, 125 lbs.



Per Dozen Sets

No. N618J—Lock No. 1099, 3¼ x 3⅜ inch, steel case, face and strike, iron bolts, nickel plated steel Key, 1 tumbler, Jet Knob, Steel Escutcheons No. 3S, 5½ x 1⅛ inch. **Nubian Bronzed**..... $7.50

★ **No. R618J**—Same as No. N618J, except **Roman Bronzed**..... 8.00

Per Dozen Sets

★ **No. P617J—Lock** No. 1099, 3¼ x 3⅜ inch, steel case, face and strike, iron bolts, nickel plated steel Key, 1 tumbler, Jet Knob, Steel Escutcheons No. 3S, 5½ x 1⅛ **Persian Bronzed**..... $7.00

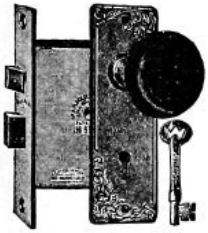
★ **No. P617**—Same as No. P616J, with Steel Knob No. 53, Daisy Pattern 9.00

Quarter dozen sets in a box, with screws; five dozen sets in a case; weight per case, 125 lbs

MORTISE LOCK SETS.

★ CROWN. LYONS DESIGN.

ALL STEEL, ROMAN BRONZED, POLISHED.



INSIDE DOOR.

Reversible for Right or Left Hand Doors.

Per Dozen Sets

★ **No. R613J—Lock** No. 6099, 3¾ x 3¼ inch, cold rolled steel case, front and strike, iron bolts, 1 tumbler, nickel plated Steel Key; **Jet Knobs** No. 6034, 2¼ inch; **Steel Escutcheons** No. 6005, 5⅞ x 2 inch. **Roman bronzed, polished** $9.50

Per Dozen Sets

★ **No. R614—Lock** No. 6099, 3¾ x 3¼ inch, cold rolled steel case, front and strike, iron bolts. 1 tumbler, nickel plated Steel Key; **Steel Knobs** No. 6053, 2¼ inch; **Steel Escutcheons** No. 6005, 5⅞ x 2 inch. **Roman bronzed, polished** $12.00

Twelfth-dozen sets in a box, with screws; weight per dozen sets, 24 lbs.

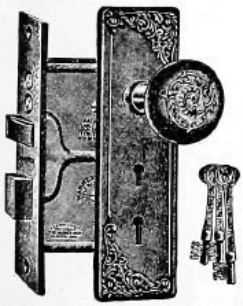
FRONT DOOR.

BRONZE METAL OUTSIDE, STEEL INSIDE.

Reversible for Right or Left Hand Doors.

Per Set

★ **No. 600 x 22⅛ Finish—**Cylinder Reversible Lock, 5½ x 4½ inch, steel case, cast bronze face, strike and bolts, three heavy German Silver Keys; both bolts operated from outside by the key, latch bolt operated from inside by thumb knob; **Wrought Bronze Knob** No. 62, 2¼ inch outside; **Steel Knobs** No. 53, 2¼ inch inside; **Wrought Bronze Escutcheon** No. 7, 10 x 2¾ inch outside; **Steel Escutcheons** No. 5S, 5⅞ x 2 inch inside. **Antique copper, medium shade** $8.00



★ **No. 616 x 22⅛ Finish—Lock** No. 6299, 5 x 3½ inch, cold rolled steel case, wrought bronze front, strike and bolts; **Wrought Bronze Knob** No. 62, 2¼ inch outside; **Steel Knob** No. 6053, 2¼ inch inside; **Wrought Bronze Escutcheons** No. 7BC, 7¾ x 2¼ inch outside; **Steel Escutcheons** No. 6001, 1¼ x 1⅝ inch inside. **Antique copper, medium shade** $2.50

ALL STEEL.

Per Set

★ **No. R615—Lock** No. 6299, 5 x 3½ inch, cold rolled steel case, front and strike, iron bolts; **Steel Knob** No. 6053, 2¼ inch; **Steel Escutcheons** No. 6007, 7¾ x 2¼ inch outside, No. 6001, 1¼ x 1⅝ inch inside. **Roman bronzed, polished** $2.00

One set in a box, with screws; weight per set, 3 lbs

MORTISE LOCK SETS.

CAST IRON, PERSIAN BRONZED.

SLIDING DOOR.

ASTRAGAL FRONT. FLAT FRONT.

Per Set

No. P3092—Lock No. P3092, 5¼ x 3⅝ inch, steel front and strike, bronze bolts, two steel flush cup Escutcheons No. P3986¼, 4½ x 2 inch, Key, class 39, for **Single Doors, flat front. Persian bronzed**..... $2.60

No. P3100—Lock No. P3100, 5¼ x 3⅝ inch, steel front and strike, bronze bolts, four steel flush cup Escutcheons No. P3986¼, 4½ x 2 inch, Key, class 39, for **Double Doors, flat front. Persian bronzed**..... 3.80

No. P3108—Lock No. P3108, 5¼ x 3⅝ inch, steel front and strike, bronze bolts, four steel flush cup Escutcheons No. P3986¼, 4½ x 2 inch, Key, class 39, for **Double Doors, astragal front. Persian bronzed**..... 4.80

One set in a box, with screws; weight per set, single doors 2 lbs., double doors 4 lbs.

PUSH PLATES.

Per Dozen

No. P3301⅝—Iron, 9⅜ x 2¾ inch, **Persian bronzed**..... $4.80

Half dozen in a box, with screws.

ELECTRIC PUSH BUTTONS.

Per Dozen

No. P01188—Iron, 2¼ inch diameter, **Persian bronzed**..... $5.00

Half dozen in a box, with screws.

FLUSH SASH LIFTS.

Per Dozen

No. P3215—Steel, 1 9/16 x 3 1/16 inch, **Persian bronzed**..... $1.20

One dozen in a box, with screws.

HOOK SASH LIFTS.

Per Dozen

No. P1840—Iron, 1⅝ x 1½ inch, **Persian bronzed**..... $0.60

Three dozen in a box, with screws.

MORTISE LOCK SETS.

INSIDE DOOR.

Reversible for Right or Left Hand Doors.

Per Dozen Sets

No. PS0101½—Lock No. P3271, 3¾ inch, wrought steel front, iron bolts, 1 tumbler, 12 changes, nickel plated steel Key, class 179¾; steel Knobs No. P03523, 2¼ inch; wrought steel Escutcheons No. P3972¼, 5⅛ x 1⅞ inches. **Persian bronzed**..... $15.40

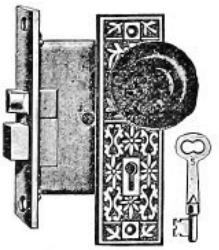
Per Dozen Sets

No. PS0100½—Lock No. P3271, 3¾ inch, wrought steel front, iron bolts, 1 tumbler, 12 changes, nickel plated steel Key, class 179¼; jet Knobs No. N3700, 2¼ inch; wrought steel Escutcheons No. P3972¼, 5⅛ x 1⅞ inches. **Persian bronzed** $11.00

Quarter-dozen sets in a box, with screws; five dozen sets in a case; weight per case, 120 lbs.

Per Dozen Sets

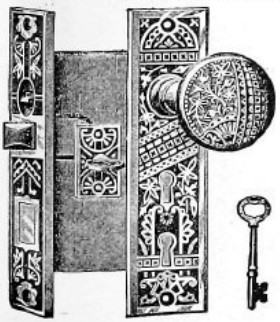
No. PS717—Lock, 3½ inch, plain steel lacquered front, strike and bolts; nickel plated flat steel Key; iron Knobs, 2¼ inch; steel Escutcheons, 5⅛ x 1½ inches. **Persian bronzed** $8.00



Per Dozen Sets

No. PS716—Lock, 3½ inch, plain steel lacquered front and strike, iron bolts, tinned iron Key; jet Knobs, 2¼ inch; steel Escutcheons, 5⅛ x 1½. **Persian bronzed**..... $5.00

Quarter-dozen sets in a box, with screws; five dozen sets in a case; weight per case, No. PS717, 130 lbs., No. PS716, 120 lbs.



FRONT DOOR.

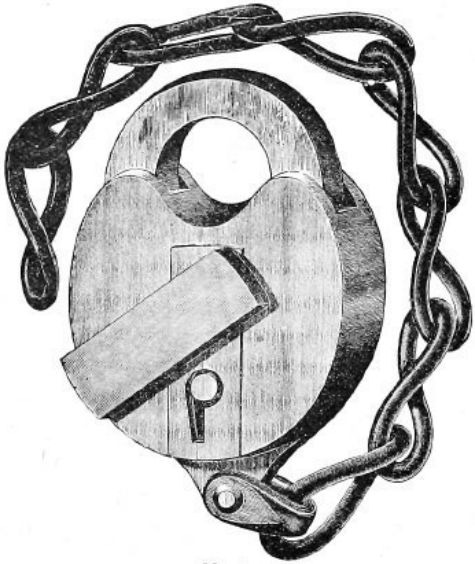
Reversible for Right or Left Hand Doors.

Per Dozen Sets

No. P1018—Lock, 5 x 3⅝ inch, ornamental iron front, strike and bolts, three nickel plated Keys; iron thumb turn; iron Knobs, 2¼ inch; iron Escutcheons, 7 x 1⅝ inch. **Persian bronzed**..... $21.00

Twelfth-dozen sets in a box, with screws; weight per dozen sets, 42 lbs.

ZELNICKER SWITCH LOCKS.

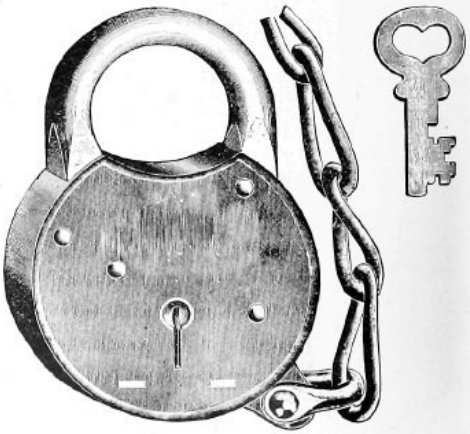


No. 1.

Cast bronze gun metal, springshackle, self-locking, spring drop cover over key hole.

No. 1. Very heavy, for railroad switches, etc. Highly polished, packed ¼ dozen in box, 2½x4x⅞ with chain.....per doz., $12 50
Keys for above, " 3 00
No. 2. Brass, plain, 2½x3½x$1^{3}/_{16}$, with chain, per dozen..... 10 50
Keys for same, per doz., 2 50
No. 3. Brass, plain, 2x3x¾, with chain.....per doz., 9 00
Keys for same... " 2 25

No. 495C. Heavy pressed steel, 12 changes available, size 2 inches, spring shackle, self-locking, full 3 levers, 2 nickel plated flat steel keys, with 9 inch tinned coil chain, full brass plated.....per doz., $6 30



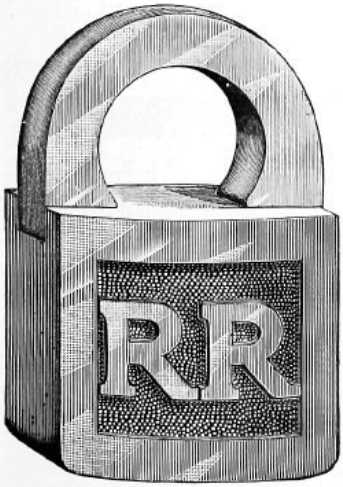
No. 495C.

No. 21.

No. 21. Solid brass, full 6 levers, 2 flat steel keys all different, size 2¼ inches.....per doz., $5 75

No. 197. Solid brass, full 3 levers, spring shackle, self-locking, 2 nickel plated flat steel keys, size 2 inches.....per doz., $3 60

No. 197.

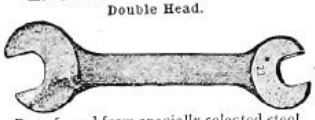


No. 406.

No. 406. Solid real bronze, extra heavy, oval case, engraved front and back, dust proof plunger, revolving cylinder key guide, spring shackle, self-locking, all brass inside work, 6 ward tumblers, highest quality, flat steel keys.....per doz., $5 50

ENGINEERS' WRENCHES.

Double Head.



Drop forged from specially selected steel.

No.	Size Bolts, U. S. Standard Nuts, inches.	Openings, inches.	Extreme Length, inches.	Unfinished, Price Each.	Finished, Price Each.
21	1/8 and 1/8	1/4 and 1/4	3 3/4	$0.12	$ 0.24
22	1/4 " 1/4	1/4 " 1/4	4	.14	.28
23	1/4 " 1/4	1/4 " 1/4	4	.15	.30
24	1/4 " 1/4	1/4 " 1/4	4 1/2	.17	.34
25	1/4 " 1/4	1/4 " 1/4	4 1/2	.18	.36
26	1/4 " 1/4	1/4 " 1/4	5 1/2	.20	.40
27	1/4 " 1/4	1/4 " 1/4	5 1/2	.21	.42
28	1/4 " 1/4	1/4 " 1/4	6 1/2	.23	.46
29	1/4 " 1/4	1/4 " 1/4	6 1/2	.25	.50
30	1/4 " 1/4	1/4 " 1/4	7 1/2	.28	.56
31	1/4 " 1/4	1/4 " 1/4	7 1/2	.30	.60
32	1/4 " 1/4	1/4 " 1/4	8 1/2	.34	.68
33	1/4 " 1/4	1/4 " 1/4	8 1/2	.36	.72
34	1/4 " 1/4	1/4 " 1/4	9 1/2	.41	.82
35	1/4 " 1/4	1/4 " 1/4	9 1/2	.43	.86
36	1/4 " 1/4	1/4 " 1/4	11 1/2	.50	1.00
37	1/4 " 1/4	1/4 " 1/4	11 1/2	.53	1.06
38	1/4 " 1/4	1/4 " 1/4	13 1/2	.62	1.24
39	1/4 " 1/4	1/4 " 1/4	13 1/2	.65	1.30
40	1/4 " 1/4	1/4 " 1/4	15 1/2	.78	1.56
41	1/4 " 1/4	1/4 " 1/4	15 1/2	.82	1.64
42	1/4 " 1/4	1/4 " 1/4	17 1/2	1.00	2.00
43	1/4 " 1/4	1/4 " 1/4	17 1/2	1.08	2.16
44	1/4 " 1/4	1/4 " 1/4	19 1/2	1.27	2.54
45	1/4 " 1/4	1/4 " 1/4	19 1/2	1.35	2.70
46	1/4 " 1/4	1/4 " 1/4	21 1/4	1.65	3.30
47	1/4 " 1/4	1/4 " 1/4	21 1/4	1.75	3.50
48	1/4 " 1/4	1/4 " 1/4	23 1/4	2.10	4.20
49	1/4 " 1/4	1/4 " 1/4	23 1/4	2.25	4.50
50	1/4 " 1/4	1/4 " 1/4	25 1/4	2.65	5.30
51	1/4 " 1/4	1/4 " 1/4	25 1/4	2.85	5.70
52	1/4 " 1/4	1/4 " 1/4	27 1/4	3.30	6.60
53	1/4 " 1/4	1/4 " 1/4	27 1/4	3.55	7.10
54	1/4 " 2	1/4 " 1/4	30 1/4	4.15	8.30
55	1/4 " 2	1/4 " 1/4	30 1/4	4.55	9.10
56	1/4 " 2 1/4	1/4 " 1/4	34 1/4	5.35	10.70
57	2 " 2 1/4	1/4 " 1/4	34 1/4	5.95	11.90

Furnished with regular thickness of heads. "Unfinished" wrenches have milled openings.

ENGINEERS' WRENCHES.

Single Head.

No.	Size Bolts, U. S. Standard Nuts, inches.	Openings, inches.	Extreme Length, inches.	Unfinished, Price Each.	Finished, Price Each.
00	1/8	1/4	2 1/2	$0.08	$0.16
0	1/8	1/4	2 1/2	.09	.18
1	1/4	1/2	3 1/4	.10	.20
2	1/4	1/2	4 1/4	.12	.24
3	1/4	1/2	5 1/4	.14	.28
4	1/4	1/2	6 1/2	.17	.34
5	1/4	1/2	7 1/2	.20	.40
6	1/4	1/2	8 1/2	.25	.50
7	3/8	1 1/4	9 3/4	.32	.64
8	3/8	1 1/4	11 1/2	.40	.80
9	3/8	1 1/2	13	.50	1.00
10	1	1 1/2	14 3/4	.65	1.30
11	1 1/2	1 1/2	16 3/4	.85	1.70
12	1 3/4	2	18 1/2	1.10	2.20
13	1 3/4	2 1/2	20 1/4	1.40	2.80
14	1 3/4	2 1/2	22 1/4	1.75	3.50
15	1 3/4	2 1/2	24	2.10	4.20
16	1 3/4	2 1/2	25 3/4	2.50	5.00
17	2	3 1/2	29 1/2	3.50	7.00
18	2 1/4	3 1/2	33	4.75	9.50

Furnished with regular thickness of heads.

DOUBLE HEAD TOOL POST WRENCHES

No.	Open End for U. S. Standard Nuts, Size Bolt, inch.	Closed End for Set Screw, Size, inch.	Length Over All inches.	Unfinished, Price Each.	Finished, Price Each.
124	1/8	1/8	6 1/2	$0.30	$0.50
129	1/4	1/4	7	.35	.60
131	1/4	1/8	7	.35	.60
132	1/4	3/8	7	.35	.60
139	3/8	3/8	7 1/2	.40	.70
140	3/8	1/4	8	.45	.80
143	3/4	3/4	9	.55	1.00

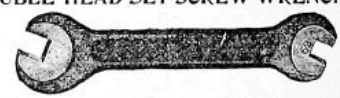
The openings in above wrenches will admit of finishing to a size larger than given in table. "Unfinished" wrenches have milled openings. Drop forged from specially selected steel.

SINGLE HEAD SET SCREW WRENCHES.

No.	For Set Screws, Size, inches.	Extreme Length, inches.	Unfinished, Price Each.	Finished, Price Each.
280	1/8	3	$0.08	$0.16
281	1/4	3 1/2	.10	.20
282	1/8	4 1/2	.12	.24
283	3/8	5 1/2	.15	.30
284	1/16	6 3/4	.20	.40
285	1/2	7	.25	.50
286	1/16	7 1/2	.27	.54
287	5/8	8	.30	.60
288	3/4	9 1/2	.35	.70
289	7/8	10 1/2	.42	.84
290	1	11 1/2	.50	1.00
291	1 1/4	12	.60	1.20

The openings in above wrenches will admit of finishing to one or two sizes larger than given in table.

DOUBLE HEAD SET SCREW WRENCHES.



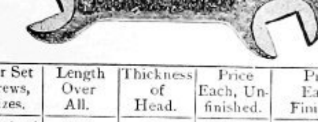
No.	For Set Screws, Size, inches.	Extreme Length, inches.	Unfinished, Price Each.	Finished, Price Each.
65	3/8 and 1/4	3 3/8	$0.13	$0.26
66	1/8 " 1/8	3 3/8	.13	.26
67	1/4 " 1/8	4	.15	.30
68	1/4 " 3/8	4	.15	.30
69	1/8 " 3/8	5	.18	.36
70	1/8 " 1/8	5	.18	.36
71	3/8 " 1/2	5 5/8	.22	.44
72	3/8 " 1/2	5 5/8	.22	.44
73	1/8 " 3/8	6 5/8	.27	.54
74	1/8 " 1/8	6 5/8	.27	.54
75	1/2 " 1/8	7 1/2	.33	.66
76	1/2 " 3/8	7 1/2	.33	.66
77	1/8 " 3/8	8 3/8	.40	.80
78	1/8 " 1/8	8 3/8	.40	.80
79	3/8 " 3/4	10	.48	.96
80	3/8 " 3/8	10	.48	.96
81	3/4 " 3/8	11 3/8	.58	1.16
82	3/4 " 1	11 3/8	.58	1.16

Furnished with regular thickness of heads. "Unfinished" wrenches have milled openings. Drop forged from specially selected steel.

DOUBLE HEAD SET SCREW TOOL POST WRENCHES.

No.	Open End for Set Screw, Size, in.	Closed End for Set Screw, Size, inches.	Length Over All, inches	Price Each, Unfinished.	Price Each, Finished
201	7/16	7/16	5½	$0.25	$0.45
202	½	½	6	.27	.50
203	9/16	½	6	.27	.55
204	⅝	⅝	6¼	.32	.60
205	11/16	⅝	6¾	.32	.65
206	¾	¾	7½	.40	.70

TRIPLE HEAD SET SCREW WRENCHES.



For Set Screws, Sizes.	Length Over All.	Thickness of Head.	Price Each, Unfinished.	Price Each, Finished.
½ ⅝ ¾	5⅝	⅜	$0.28	$0.56

The openings in above wrenches will admit of finishing to a size larger than given in table.

SINGLE HEAD BOX WRENCHES.

No.	For Set Screw, Size, inches.	Length Over All, inches.	Thickness of Head, inches.	Price Each, Unfinished.	Price Each, Finished.
250	¼	3⅜	9/32	$0.10	$0.20
251	5/16	3¾	5/16	.11	.22
252	⅜	4¼	⅜	.13	.26
253	7/16	4⅞	7/16	.16	.32
254	½	5½	15/32	.19	.38
255	9/16	6¼	½	.22	.44
256	⅝	7	9/16	.26	.52
257	¾	8	⅝	.30	.60
258	⅞	9	11/16	.36	.72
259	1	10	¾	.44	.88

Unfinished wrenches have milled openings.

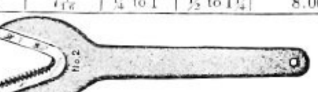
DOUBLE HEAD "S" WRENCH.

No.	Size of Opening, inches.	Thickness of Heads, inches.	Length Over All, inches.	Price Each, Unfinished	Price Each, Finished.
220	⅜x 7/16	¼	4	$0.10	$0.20
221	½x 9/16	5/16	5	.15	.30
222	¾x 13/16	⅜	6	.20	.40
223	⅞x1	7/16	7	.25	.50
224	1 x1⅛	½	8	.30	.60
225	1 3/16x1¼	9/16	9	.35	.70

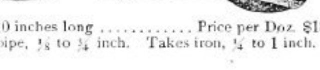
ALLIGATOR OR BULL DOG WRENCHES

Drop Forged

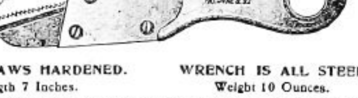
No.	Length, inches.	Holds Pipe, inches.	Holds Round Iron, in.	Price per Dozen.
0	4	⅛ to ¼	¼ to 7/16	$4.00
1	5¼	⅛ to ⅜	¼ to ¾	4.00
1½	5¼	⅛ to ⅜	¼ to ¾	5.00
1¾	7 1/16	¼ to 1	½ to 1¼	8.00



No.	Length, inches.	Holds Pipe, inches.	Holds Round Iron, in.	Price per Dozen
2	9	⅜ to ¾	½ to 1	$12.00
3	16	½ to 1¼	¾ to 1⅜	24.00
4	22	1¼ to 2	1½ to 2½	36.00
4½	24	1½ to 2½	1⅞ to 3¼	48.00
5	27	2 to 3	2¼ to 3½	54.00



Twin, 10 inches long .... Price per Doz. $18.00
Takes pipe, ⅛ to ¾ inch. Takes iron, ¼ to 1 inch.



BOTH JAWS HARDENED. **WRENCH IS ALL STEEL**

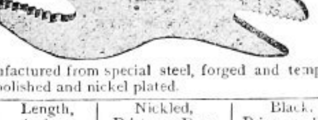
Length 7 Inches. Weight 10 Ounces.

It will fit a pipe up to ¾-inch, or a nut that is 1⅛-inch across.

List Price for Wrenches, $12.00 per dozen.

List Price for Extra Jaws, $3.00 per dozen.

"ALWAYS READY" WRENCH.



Manufactured from special steel, forged and tempered in oil, polished and nickel plated.

Nos.	Length, inches.	Nickled, Price per Doz.	Black, Price per Doz
1	5	$ 5.00	$ 4.50
2	7	6.75	6.25
2½	9½	10.50	10.00
3	11½	16.00	15.50

BAXTER "S" WRENCHES.

Size.....Inches	4	6	8	10	12
Price.....Per dozen	86.00	9.00	12.00	18.00	24.00

WESTCOTT ADJUSTABLE S WRENCHES.

Pipe Wrench.

Nut Wrench.

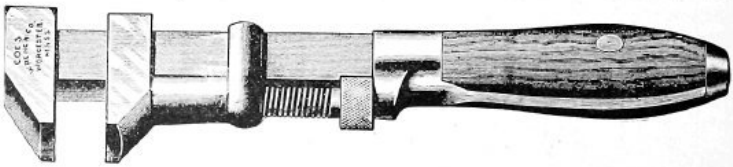
WESTCOTT PIPE WRENCH.

Length,	Inches,	6	8	10	12	14
Takes Pipe from	"	⅛ to ⅜	⅛ to ¾	⅛ to 1	⅛ to 1¼	⅛ to 1½
Price,	Each,	1.00	1.25	1.50	2.00	2.50

WESCOTT NUT WRENCH.

Length,	Inches,	6	8	10	12	14
Opens,	"	¾	1	1⅜	1⅝	2
Price,	Each,	.60	.75	1.00	1.25	1.75

Coes' Genuine Improved Patent "Knife Handle" Screw Wrench.



Price List

Size	BLACK	Size	BRIGHT
6 inch	$ 9.00	6 inch	$10.00
8 "	10.00	8 "	11.00
10 "	12.00	10 "	14.00
12 "	14.00	12 "	16.00
15 "	24.00	15 "	26.00
18 "	30.00	18 "	32.00
21 "	36.00	21 "	38.00

STILLSON'S PATENT WRENCH.

Length open in inches.	6	8	10	14	18	24	36	48
Takes from	⅛ to ½ in.	⅛ to ¾ in.	⅛ to 1 in.	¼ to 1½ in.	¼ to 2 in.	⅓ to 2½ in.	½ to 3½ in.	1 to 5 in.
Prices	$2 00	$2 00	$2 25	$3 00	$4 00	$6 00	$12 00	$18 00
Jaws	.67	.67	.75	1 00	1 33	2 00	4 00	6 00
Frames	.25	.25	.33	.45	.55	.65	.75	1 00
Nuts	.20	.20	.27	.35	.42	.50	.65	.80

TRIMO PIPE WRENCH.

Length open in inches.	6	8	10	14	18	24	36	48
Takes from	⅛ in. wire to ½ in. pipe.	⅛ in. wire to ¾ in. pipe.	⅛ in. wire to 1 in. pipe.	¼ in. wire to 1½ in. pipe.	¼ in. wire to 2 in. pipe.	¼ in. wire to 2½ in. pipe.	½ in. pipe to 3½ in. pipe.	1 in. pipe to 5 in. pipe.
Price	$2 00	$2 00	$2 25	$3 00	$4 00	$6 00	$12 00	$18 00
Jaw	.67	.67	.75	1 00	1 33	2 00	4 00	6 00
Nut	.20	.20	.27	.35	.42	.50	.65	.80
3. Inserted Jaw	.25	.25	.33	.50	.55	.65	1 00	1 25
4. Frame	.25	.25	.33	.45	.55	.65	.75	1 00

BEMIS & CALL COMBINATION WRENCHES.

BRIGHT, WITH SHORT NUT.

10-inch, adjustable to pipe from	¼	inch to	1	inch in diameter,					Per dozen,	$23 00
12 "	"	"	"	¼	"	1¼	"	"	"	26 00
15 "	"	"	"	¼	"	2¼	"	"	"	37 00
18 "	"	"	"	½	"	3	"	"	"	66 00

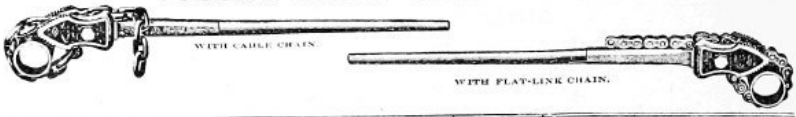
BLACK. SAME LIST.

BRIGHT, WITH LONG NUT.

10-inch, adjustable to pipe from	¼	inch to	1	inch in diameter,					Per dozen,	$25 25
12 "	"	"	"	¼	"	1¼	"	"	"	28 50
15 "	"	"	"	¼	"	2¼	"	"	"	40 50
18 "	"	"	"	½	"	3	"	"	"	72 00

BLACK. SAME LIST.

VULCAN CHAIN PIPE WRENCH.



Size	No. 10.	No. 11.	No. 12.	No. 13.	No. 13½.	No. 14.	No. 15.
Price, with flat-link chain.....Each	$2.50	3.50	5.00	7.00	9.00	11.00	18.00
Price, with cable chain..... "	$2.25	3.25	4.50	6.25	7.75	9.50	16.00
Capacity, size pipe.....Inches	⅛ to ¼	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12
Length over all..... "	13¼	20	27	37	44½	50½	64½
Weight.....Pounds	1¾	4¼	8½	16	21	29	49
Extra flat-link chains.....Each	$0.75	1.00	1.50	2.50	3.25	4 00	6.00
Extra cable chains..... "	$0.50	.75	1.00	1.75	2.00	2.50	4 00
Extra jaws.....Per pair	$1.00	1.75	2.75	4.00	4.75	5.50	7.50

COMMON PIPE TONGS.

Size.....Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5
Price.....Each	$0.60	.65	.70	.75	.90	1.10	1 30	1.50	1.90	2.50	3.50	4.00	6.00	8.00

STANWOOD PIPE CUTTER.

Number	1	2	3.
Size Pipe.....Inches	⅛ to 1	1 to 2	2 to 3
Case Hardened.....Each	$1.50	2.25	7.00
Steel Faced..... "	1.75	2.50	7.50
Cutter Wheels	.12	.18	.25
Blocks and Wheels	.45	.60	1.25

SAUNDERS' ONE-WHEEL AND ROLLER PIPE CUTTER.

Number	1	2	3	4
Size Pipe.....Inches	⅛ to 1	1 to 2	2 to 3	2½ to 4
Cutters.....Each	$3.00	4.50	11.00	18.00
Wheels..... "	.24	.32	.60	.60
Block and Wheels..... "	1.25	1.75	2.75	3.50
Rollers..... "	.24	.32	.50	.50
Pins..... "	.10	.10	.15	.15

THE V. & B. PIPE WRENCH.

Cut showing position when working on 1½ inch Pipe, and guaranteed not to crush nor lock on any size pipe within its range.

Cut showing position when used on Hexagon Nuts. It will not mar the Nut as its positive grip never slips.

Cut showing position when in use on Square Nuts. It will be seen that the harder the pull, the tighter the grip, that will never slip no matter how greasy the nut may be.

No.	Takes Pipe	Length	Weight	Price
10	⅛ to 1	10 in.	1¼ lbs.	$2.25 each
14	¼ to 1½	14 in.	2¼ lbs.	3.00 "
18	⅜ to 2	18 in.	4½ lbs.	4.00 "
24	½ to 2½	24 in.	7 lbs.	6.00 "

No.	Extra Jaws.	Extra Handles
10	$0.75 each.	$1.50 each
14	1.00 "	2.00 "
18	1.33 "	2.67 "
24	2.00 "	4.00 "

Nos. 10 and 14, half dozen in a box.
Nos. 18 and 24, packed loose.

COAL MINERS' WEDGES.

Missouri Pattern.

Regular Pattern
Oil Finished

PER POUND

Hand Made. Extra Quality Steel, Oil Tempered, Assorted 1½ to 3 lbs.. $

Standard, Cast Steel, Assorted 1½ to 3 lbs., $

WOOD CHOPPERS' TIE, AND STAVE MAKERS' WEDGES

Regular, Fluted, Wood Choppers

PER POUN

Oil Finished, Assorted 3 to 5 lbs., $
Painted Red, **Axe Finish,** Assorted 3 to 5 lbs., $

Wood Choppers' and Tie Makers'

Oil Finished, Spread Point. PER POUND.

Hand Made, Extra Quality Steel, 3, 3½, 4, 4½ and 5 lbs., **Assorted 3 to 4 lbs.,** $

Steel, Oil Finish, 3, 3½, 4, 4½ and 5 lbs. **Assorted 3 to 4 lbs.,** $

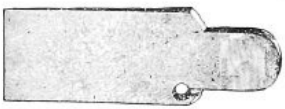
Stave Makers'

Oil Finished, Flared Point

PER POUND.

Hand Made, Extra Quality Steel, 3, 3½ and 4 lbs., **Assorted 3 to 4 lbs.,** $
Steel, 3, 3½ and 4 lbs., **Assorted 3 to 4 lbs.,** $

SAW WEDGES



Solid Cast Steel, Oil Finished,

Assorted, Weight, each, 1½, 1¾ and 2 lbs., PER POUND. $0.30

SCYTHES.

Railroad Grass or Weed Scythes.....per doz., $9 00

SCYTHE SNATHS.

Patent Loop, Extra White Ash, Brass Trimmed.....per doz., $10 00
" " " " " Iron " ..... " 9 50

BUSH SCYTHES.

Bush or Brush, Cast Steel.....per doz., $8 25

BUSH SNATHS.

Patent Loop, Extra Heavy, Iron Trimmed.....per doz. $11 00
Socket Heel, with Two Rings, " ..... " 10 00

BUSH HOOKS.

Cast Steel.....per doz., $15 00

STEEL RAKES.

STEEL BOW RAKES.

Solid Cast Steel, Curved Teeth, Capped Ferrules, Oiled Tempered, Bronze Finished.

No.	No. Teeth.	Price per doz.	No	No. Teeth.	Price per doz.
S B 10	10	$16 50	S B 14	14	$19 50
S B 12	12	18 00	S B 16	16	21 00

Our special patterns of solid Bow Rakes are forged from one solid piece of steel, no welds. Polished curved teeth; correct shape, and uniform in size and per.

FLAT NOSE PLIERS.

5 inch	Per doz.	$6.00
6 "	"	7.00
7 "	"	8.00
8 "	"	10.00

ROUND NOSE PLIERS.

5 inch	Per doz.	$9.00
6 "	"	10.00
7 "	"	11.00
8 "	"	12.00

SIDE CUTTING PLIERS.

6 inch	Per Doz.	$13 00
7 "	"	18 00
8 "	"	20 00

CUTTING NIPPERS.

Extra Quality, 5 inch	Per Doz.	$15.00
" " 6 "	"	20.00
" " 7 "	"	24.00
" " 8 "	"	30.00

CUTTING NIPPERS.

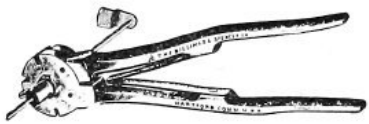
EXTRA HEAVY, WITH SET SCREW.

7 inch	Per Doz.	$2.50
8 "	"	2.88
9 "	"	3.25
10 "	"	3.60
12 "	"	4.25
14 "	"	5.00
16 "	"	10.00

THE BILLINGS WIRE CUTTER.

This tool is drop forged and provided with 4 cutting edges on the rim besides two which are enclosed.

It will cut iron wire, tool steel wire and stubbs rods, also adjustable gage attached by which wire can be cut in uniform gage. Length 10 inches.....Price, $3.00



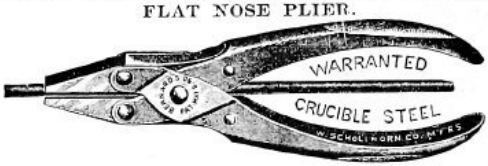
WIRE SHEARS AND PLIERS COMBINED.

4½	inch will cut anything not larger than No. 14 wire	Price, per dozen,	$10 00
6	" " " " " " " " 11 "	" "	12 00
8	" " " " " " " " 8 "	" "	15 00
10	" " " " " " " " 6 "	" "	20 00
12	" " " " " " " " 6 "	" "	24 00

Round nose the same price.

OPEN THROAT PARALLEL PLIERS.

FLAT NOSE PLIER.

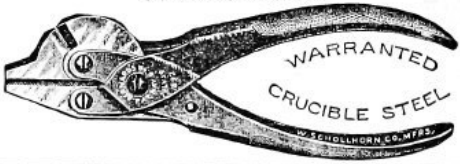


Size (extra heavy)	Inches	4½	5½	6½	7½
List	Per dozen	$7.00	9.00	11.00	15.00
Extra Jaws	"	2.00	2.50	3.00	4.00

ROUND NOSE PLIER.

Size	Inches	4½	5½	6½
List	Per dozen	$7.00	9.00	11.00
Extra Jaws	"	2.00	2.50	3.00

CUTTING PLIER.



Size (extra heavy)	Inches	4½	5½	6½	7½
List	Per dozen	$11 50	14.50	17.50	24.00
Extra Cutting Jaws—List	"	4.50	5.00	5 50	7.00
" " Blades,	"	2.75	3.00	3.25	4.00
" Center Screws,	"	.25	.30	35	.40
" Bolts and Nuts,	"	.45	50	55	.60

BURNER PLIERS.

PRICES.

Polished complete, 5 inches	$ 8.00
" " 6 "	9.00
Nickel Plated, 5 inches	9.25
" " 6 "	10.50

PRICES.

Polished complete, 7 inches	$10.00
Nickel Plated	11.75

GAS PLIERS.

LENGTH.	INCHES.	8 in.	9 in.	10 in.	11 in.	12 in.	13 in.	14 in.
Black Handles	Per dozen	$12.00	14.00	15.00	16.00	18.00	21.00	24.00
All Polished	"	15.00	17.00	18.00	19.00	21.00	24.00	27.00

IMPROVED COMBINATION PLIERS.

GAS PLIERS, WIRE CUTTERS, WRENCH AND SCREW-DRIVER COMBINED

		Black Finish.	Nickel Plated
8-inch	Per dozen,	$13 50	$15 00
8 " Plier Bolts	Each,	07½	
8 " Plier Nuts	"	05	
10-inch	Per dozen,	18 00	21 00
10 " Plier Bolts	Each,	10	
10 " Plier Nuts	"	06	
14-inch	Per dozen,	24 00	30 00
14 " Plier Bolts	Each,	10	
14 " Plier Nuts	"	06	

YANKEE SPRING CALIPERS.

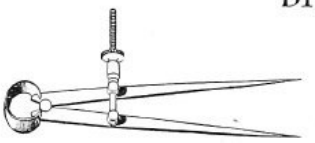
Outside.		Inside.	
2½ inch, with Solid Nut	$0 65	with Spring Nut	$0 90
3 " " " "	70	" " "	95
4 " " " "	75	" " "	1 00
5 " " " "	80	" " "	1 05
6 " " " "	85	" " "	1 10
8 " " " "	1 00	" " "	1 25

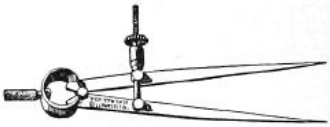
Sent with solid nut unless otherwise ordered.

Keyhole Calipers.

3 inch	$0 70
4 inch	75

DIVIDERS.





2½ inch	$0 65
3 "	70
4 "	75
5 "	80
6 "	85
8 "	1 10

2½ inch, with Thumb Attachment	$0 90
3 " " " "	95
4 " " " "	1 00
5 " " " "	1 05
6 " " " "	1 10
8 " " " "	1 25

YANKEE THREAD CALIPERS.

3 inch, with Solid Nut	$0 70	with Spring Nut	$0 95
4 " " " "	75	" " "	1 00
5 " " " "	80	" " "	1 05

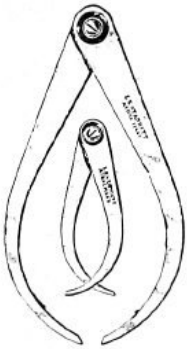
FAY THREAD CALIPERS.

Thread No. 76.

3 inch, with Solid Nut	$1 00	with Spring Nut	$1 15
4 " " " "	1 10	" " "	1 25
5 " " " "	1 10	" " "	1 25

CALIPERS.

STARRETT'S IMPROVED FIRM-JOINT CALIPERS.

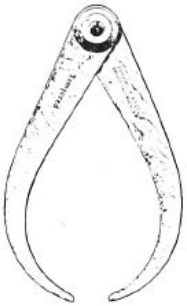


PRICES.

3 inch	.....	$0.40
4 "	.....	.50
5 "	.....	.55
6 "	.....	.65
8 "	.....	.80
10 "	.....	.90
12 "	.....	1.00
14 "	.....	1.50
16 "	.....	1.75
18 "	.....	2.10
20 "	.....	2.50
24 "	.....	3.00

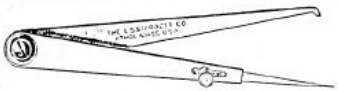
The above sizes refer to the length of the Calipers. Their capacity is about one-third greater than the size given.

STEVENS FIRM-JOINT CALIPERS.



3 inch	.....	$0.40
4 "	.....	.50
5 "	.....	.55
6 "	.....	.65
8 "	.....	.80
10 "	.....	.90
12 "	.....	1.00

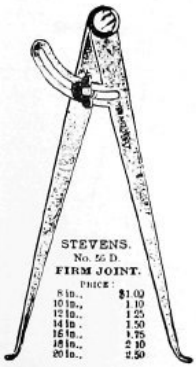
STARRETT IMPROVED NEW FIRM-JOINT HERMAPHRODITE CALIPERS.



4 inch	$0 65	8 inch	$1 00
6 "	80	10 "	1 20

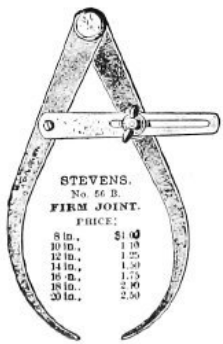
STEVENS FIRM-JOINT HERMAPHRODITE CALIPERS.

3 inch	$0 40	8 inch	$0 80
4 inch	50	10 inch	90
5 inch	55	12 inch	1 00
6 inch	65		



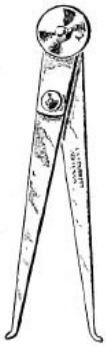
WING FIRM JOINT CALIPERS.

IN ORDERING BE SURE AND CALL FOR WING JOINT CALIPERS, AS WE MAKE 8, 10 AND 12 INCH WITHOUT WING AND SET SCREW.



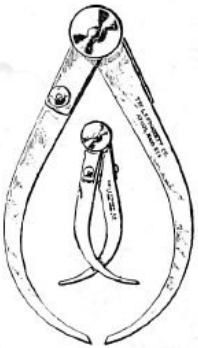
CALIPERS AND DIVIDERS.

STARRETT'S LOCK-JOINT CALIPERS.



4 inch	$0 90	14 inch	$2 00
6 inch	1 00	16 inch	2 25
8 inch	1 25	18 inch	2 50
10 inch	1 50	20 inch	2 75
12 inch	1 75	24 inch	3 50

STARRETT'S LOCK-JOINT TRANSFER CALIPERS.



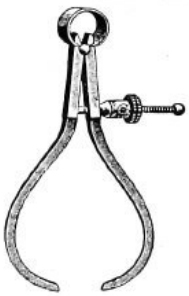
4 inch	$1 25	14 inch	$2 50
6 inch	1 50	16 inch	2 75
8 inch	1 75	18 inch	3 00
10 inch	2 00	20 inch	3 50
12 inch	2 25	24 inch	4 25

LOCK-JOINT DIVIDERS.

6 inch	$1.00
8 inch	1.25
10 inch	1.50

SPRING DIVIDERS.

FAY SPRING CALIPERS.



	Solid Nut.	Spring Nut.
2½ inch	$1 00	$1 15
3 inch	1 00	1 15
4 inch	1 10	1 25
5 inch	1 10	1 25
6 inch	1 35	1 50

	Solid Nut.	Spring Nut.
3 inch	$1 00	$1 15
4 inch	1 10	1 25
5 inch	1 10	1 25
6 inch	1 35	1 50

	Solid Nut.	Spring Nut.
2½ inch	$1 00	$1 15
3 inch.	1 00	1 15
4 inch.	1 25	1 40
5 inch.	1 25	1 40
6 inch.	1 60	1 75

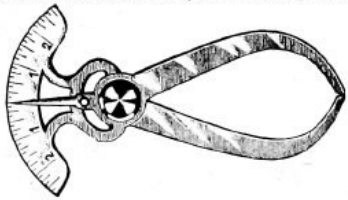
DUPLICATE PARTS FOR FAY CALIPERS.

Screw and Ball	$0 15	Spring Nut	$0 25	Jam Washer	$0 10
Thumb Attachment	15	Leg	35	Fulcrum Stud	10
Solid Nut	10	Spring	25	Stud	10

REGISTER CALIPERS.

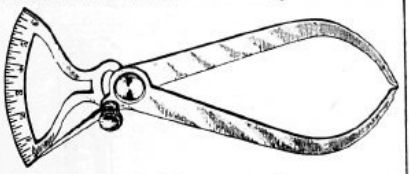
CAST STEEL

For inside and outside measurement, with Set Screw, Nickel Plated



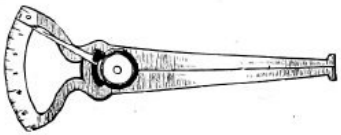
	3 inch.	4 inch.	5 inch.	6 inch
Per dozen	$7 50	9 00	10 50	12 00

For outside measurement, with Set Screw, Nickel Plated.



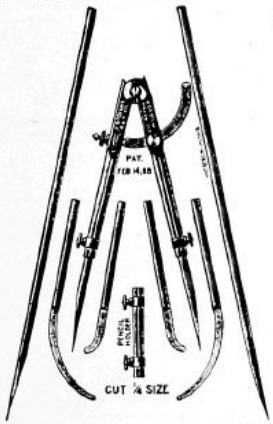
6 inch ..... Per dozen, $12 00

For inside measurement with Set Screw, Nickel Plated.



8 inch ..... Per dozen, $15 00

STEVENS' COMBINED OUTSIDE AND INSIDE CALIPER AND DIVIDER.

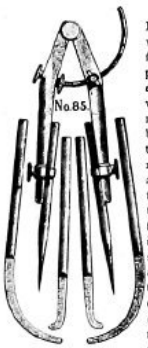


Price per set, all nickeled $4 00

PRICE OF PARTS.

Divider Legs, long and short	Each,	$0 50
Outside and inside Caliper Legs	"	50
Pencil Holder	"	50

STARRETT'S MPROVED EXTENSION DIVIDER.

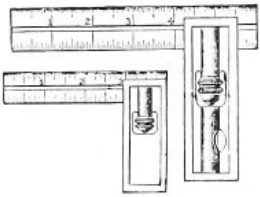


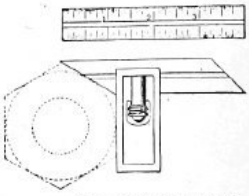
This is a well-made, nicely finished Divider, with auxiliary caliper legs, which, together with a common pencil, form convenient combinations. Our patent locking nut between the arms, against which a spiral spring acts, is a valuable feature. After the fine adjustment is made, the nut may be turned back, locking spring and arms firmly, thus remedying the weak point which renders the common wing divider only as stiff as the adjusting spring. A full-threaded nut on the stud, through which the quadrant passes, is a more durable fastener than two or three threads tapped in the arm to hold the wing of the old style. The head and arms of this tool are made from the best malleable iron, the rest of steel. The points are hardened and warranted first-class. The smallest size is 7 inches long; by adjustment of points becomes 9 inches, and will scribe a 22-inch circle; will caliper 11 inches outside and 13 inches inside. The second size is 9 inches, by adjustment of points becomes 12 inches, and will scribe a 30-inch circle, and caliper 14 inches outside and 16 inches inside. The Dividers will be sold without caliper legs *when so ordered.*

PRICES.

7 inch, with Divider Legs only	$1 25
9 inch, with Divider Legs only	1 50
7 inch, complete	2 25
9 inch, complete	2 50

STARRETTS' PATENT DOUBLE SQUARES.





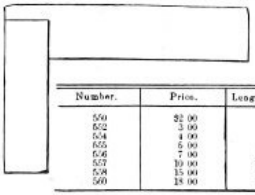
4 inch ..... Price, $1 25; with both blades, $1 65
6 inch ..... " 2 00, " " 2 50
9 inch ..... " 3 00
12 inch ..... " 4 00

Both blades with 4 and 6-inch always sent unless otherwise ordered.

STARRETT'S TRY SQUARES.

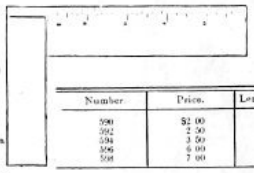
STEEL SQUARES.

HARDENED CAST STEEL.



Number.	Price.	Length of Blade.	Length of Beam.
550	$2 00	1½"	1⅛"
552	3 00	3	2¼
554	4 00	4½	3⅜
555	5 00	6	4½
556	7 00	9	5⅝
557	10 00	12	7½
558	15 00	15	8⅞
560	18 00	18	10½

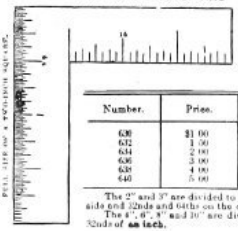
GRADUATED, NOT HARDENED.



Number.	Price.	Length of Blade.	Length of Beam.
590	$2 00	3"	2"
592	2 50	4	2⅝
594	3 50	6	3⅞
596	6 00	9	5"
598	7 00	12	6¾

THIN STEEL SQUARES.

FOR MACHINISTS AND DRAUGHTSMEN.

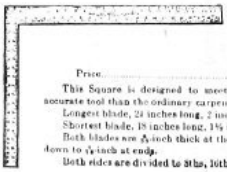


Number.	Price.	Length of Blades.	Width of Blades.
630	$1 00	2"	½"
632	1 50	3	⅝
634	2 00	4	¾
636	3 00	6	1
638	4 00	8	1¼
640	5 00	10	1½

The 2" and 3" are divided to 16ths and 64ths of an inch on one side and 32nds and 64ths on the other.
The 4", 6", 8" and 10" are divided on both sides to 16ths and 32nds of an inch.

STEEL SQUARES.

FOR MILLWRIGHTS.

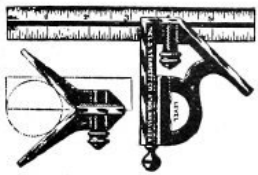


Price $10 00

This Square is designed to meet the wants of parties desiring a more accurate tool than the ordinary carpenters' square.
Longest blade, 24 inches long, 2 inches wide.
Shortest blade, 18 inches long, 1½ inches wide.
Both blades are ⅜ inch thick at the corner where they unite, and taper down to ¼ inch at ends.
Both sides are divided to 8ths, 16ths, 32nds and 64ths of an inch.

SQUARES, PROTRACTORS, ETC.

STARRETT'S PATENT COMBINATION SQUARES.

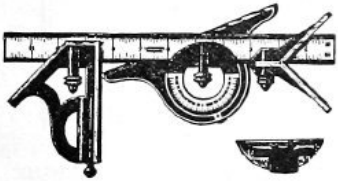


4	inch, without center head or level				$0 75
6	" with center head			$1 50; without,	1 00
9	" " " "			"	1 25
12	" " " "			"	1 50
18	" " " "			"	2 25
24	" " " "			"	2 75

The 6, 9, 12, 18 and 24-inch have levels and center heads, and will be sent complete unless otherwise ordered. The 18 and 24-inch have same stock as 12-inch.

The blades are graduated in No. 4, No. 1, No. 2 and No. 7 graduations. Those of No. 4 graduation being most used, will be sent unless otherwise ordered.

STARRETT'S COMBINATION SET.

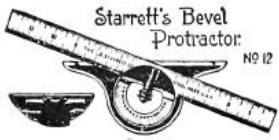


9 inch, set complete	$3.75	18 inch, set complete	$4.75
12 inch, set complete	4.00	24 inch, set complete	5.25

LOCOMOTIVE GUIDE LINER.

This instrument was devised after many urgent requests from intelligent mechanics, there having been nothing of the kind on the market. The lightness of this tool, combined with strength and accuracy, together with an adjustable level in each end, adapting it to be used either side up, and the convenient way of adjusting the pointer, all go to make it just the thing needed. Length over all, 14 inches; span of arch, 3¼ inches.

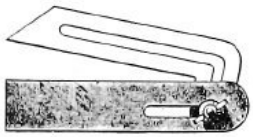
Price $3,00



9 inch	$2.75	18 inch	$3.50
12 inch	3.00	24 inch	4.00

Protractor Head only, $2.00.

STARRETT'S UNIVERSAL BEVELS.



Price, 3 inch ..... $...

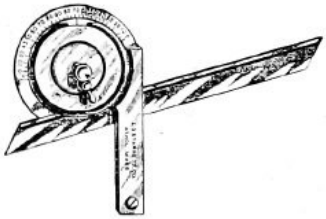
IMPROVED BEVELS.

6 inch	$1.25
9 inch	1.50
12 inch	1.75

STARRETT'S INCLINOMETER.

With 12-inch blade	$5.00
With 18-inch blade	6.00
With 24-inch blade	7.00
Center head, to fit all sizes	.75

UNIVERSAL BEVEL PROTRACTOR.



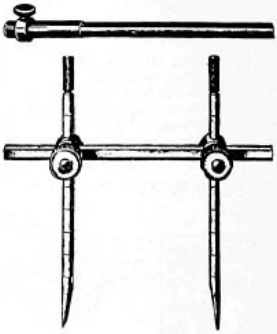
This tool weighs six ounces. The blade is 7 by ½ inch, the stock 4 inches long, and both are made from sheet steel, nicely finished. The disc is graduated in degrees from 0 to 90 each way, and rotates the entire circle on a central stud inside the case. The blade (clamped by an eccentric stud against the edge of the disc) may be slipped back and forth its full length, or turned at any angle around the circle and firmly clamped at any point, adapting it for work in positions where others cannot be used, and rendering the common universal bevel (for transferring angles) unnecessary. One side of the stock being flat, makes it a convenient tool for laying on paper in drafting, etc., and it has double the utility of any other tool of the kind.

PRICES.

7 inch	$5 00
12 inch	6 00
With both 7 and 12-inch blades	6 50

In Leatherette Case, 7 inch, 75 cents extra; 12 inch, $1.00 extra.

EXTENSION STEEL BEAM TRAMMELS.



The beam of this tool is $\frac{5}{16}$ inch round, with one side flattened. It is made in one, two or three sections, of 14-inch lengths each, and coupled together by means of our improved socket coupling and grip nut, rigidly holding them for long reaches. With one 14-inch section only, it weighs but 8 ounces. The slides carrying the points grip both beam and points, by a partial turn of the knurled nut. Fine adjustments are made by a slight rotation of one or the other eccentric point, which by friction springs retain it when the nut is loosened.

The Trams are nicely finished and will be supplied with any number of the sections desired.

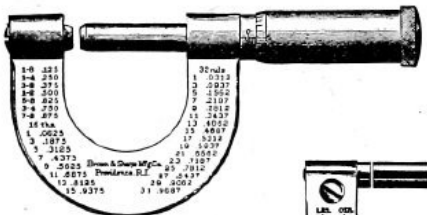
PRICES.

	Not Plated.	Plated.
With one section, 14 inch	$2.20	$2.50
" two " 28 "	2.60	3.00
" three " 42 "	3.00	3.50

Those not nickeled will be sent unless otherwise ordered.

MICROMETER CALIPER No. 15.

ENGLISH OR METRIC MEASURE.



This Caliper is shown full size in cut, and measures all sizes less than an inch by thousandths of an inch.

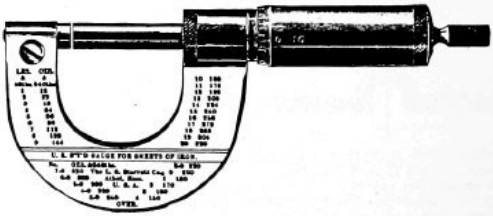
This Caliper is also made to measure all sizes less than twenty-five millimetres by hundredths of a millimetre. When so made, the table o decimal equivalents is omitted.

Price, $5.00. In Morocco Case, $5.50

MICROMETER AND WEIGHT INDICATOR.

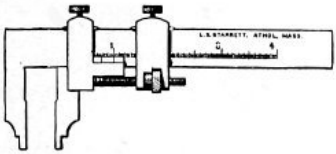
By this Micrometer and Weight Indicator, the measure as fine as .1280 or $\frac{1}{8\,1\,9}$ of an inch up to 1 inch, and the weight from ½ ounce up to 40 pounds, the standard weight for a plate 1 inch thick, are shown.

Price $6.50 In Leatherette Case, $7.00.



MICROMETER CALIPER SQUARES.

FOR OUTSIDE AND INSIDE MEASURE.



This instrument is invaluable, as it enables one to enlarge or decrease work one or more thousandths from that calipered, and fills the bill for both a first-class caliper square and micrometer of large scope and quick adjustment. The jaws are 1⅛ inches long, hardened, and open four inches. One side of the beam is graduated in 64ths and the other in 40ths; and either side may be used as a common caliper square, or, through the micrometer, to show 1.000ths full length, on either inside or outside work.

In Leatherette Case.....$8.75
Without Case 8.00

Sent with case unless otherwise ordered.

CALIPER SQUARES.

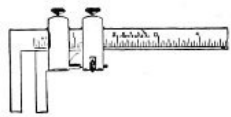
The above cut represents an improved tool for both outside and inside measure. The beam is nicely graduated, 64ths on one side, 100ths on the other.

For close work this is a reliable tool.

PRICES.

3 inch, with adjusting screw.....$3 50; without, $3 00
4 " " " " ..... 4 00; " 3 50
6 " " " " ..... 5 50; " 5 00

With hardened jaws, extra, $1.50.

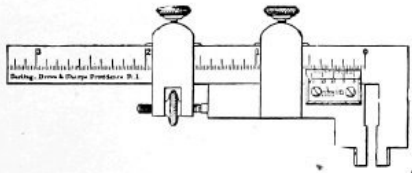


The above cut is furnished with or without adjusting screw. The 4, 6 and 9-inch takes inside as well as outside measurements.

One side divided to 64ths, the other to 100ths inches.

2 inch, without adjusting screw, jaws ¾ inch long..$2 25
4 " " " " " 1½ " " ... 3 50
6 " " " " " 2 (hardened and ground) 5.50
9 " " " " " 3½ " " .. 9.00
2 inch, with adjusting screw like cut, jaws ¾ in. long 3 50
4 " " " " " " 1½ " " 4 50
6 " " " " " " 2 (hard. & grnd.) 7.50
9 " " " " " " 3½ " " 11.00

D. B. AND S. POCKET VERNIER CALIPER.



This Pocket Vernier Caliper is graduated on the front to read, by means of a vernier, to thousandths of an inch. It is graduated on the back to 64ths of an inch. The jaws are of steel, hardened and ground, are ¾ inch long, ¼ inch wide when closed and take inside as well as outside measurements. The Caliper measures to 1 11-16 inch outside diameter.

This Caliper is furnished graduated to millimetres in place of 64ths of an inch, with a vernier to read to 50ths of a millimetre.

An explanation of the vernier is sent with each Caliper. Price, $10.00. In Morocco Case, $10.50.

D. B. AND S. VERNIER CALIPERS.

No.	Price in Morocco Case.	Size.	Length of Jaws.	Width of Jaws Closed.
682	$15 00	6 inch	1¼ inch	¾ inch
684	18.00	12 "	1¾ "	3/8 "
686	20.00	12 "	2¼ "	1/2 "
688	25.00	24 "	1¾ "	5/8 "

These Calipers are graduated on the front to read, by means of a vernier, to thousandths of an inch. They are graduated on the back to 64ths of an inch. The jaws are hardened and ground and take inside as well as outside measurements. Points are placed on the bars and slides so that dividers can be set to transfer distances.

These Calipers are furnished graduated to millimetres, in place of 64ths of an inch, with verniers to read to 50ths of a millimetre.

An explanation of the vernier is sent with each Caliper.

LEVELS.

NICKEL PLATED POCKET LEVELS.

2½ inch ..... $0 40 | 3½ inch $0 60

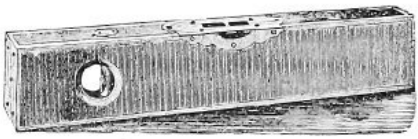
STARRETTS 3½ INCH BENCH LEVEL.

3½ inch ..... Price, $0 30

BENCH LEVELS WITH DOUBLE PLUMBS.

6 inch	$1 50	18 inch	$2 00
9 "	1 65	24 "	2 25
12 "	1 75		

STRATTON'S LEVELS.



The above cut represents our No. 1 Adjustable Plumb and Level. The corners are protected from injury and preserved true and perfect by brass rods extending the entire length of the Level, securely attached to the wood. These Levels have two ornamental brass lipped side views, heavy brass top and end plates, and are made of the best thoroughly seasoned mahogany and rosewood, polished.

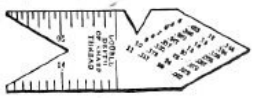
PRICES.

		Rosewood.	Mahogany.
No. 1	22 inch	Each, $6 50	$4 70
" 1	24 "	" 7 00	4 85
" 1	26 "	" 7 25	5 00
" 1	28 "	" 7 60	5 15
" 1	30 "	" 8 00	5 40
No. 2	Patent Adjustable Mahogany Plumb and Level, 2 ornamental Brass Lipped Side Views, heavy Circular End Top Plate, Tipped, Polished, 26, 28 and 30 inch		Each, $3 60
No. 3	Is like No. 2, with Tips like No. 4; 26, 28 and 30 inch		" 3 00
No. 4.	Patent Adjustable Mahogany Plumb and Level, two Side Views, heavy Circular End Top Plate, Tipped, Polished, 26, 28 and 30 inch		" 2 10
No. 5.	Patent Adjustable Cherry Plumb and Level, two Side Views, heavy Circular End Top Plate, Polished, 26, 28 and 30 inch		" 1 50
No. 6.	Mason's Patent Adjustable Mahogany Plumb and Level, two ornamental Brass Lipped Side Views, heavy Circular End Top Plate, Polished, 36 inch		" 3 25
No. 7.	Mason's Level Mahogany Adjustable Level and Plumb, two Side Views, heavy Circular End Top Plate, Polished, 36 inch		" 2 50
No. 8.	Mason's Level Cherry Adjustable Level and Plumb, two Side Views, heavy Circular End Top Plate, Polished, 36 inch		" 2 00
No. 10.	Machinist's Level. The Machinist's Levels have Brass Views, heavy Brass Top and End Plates, and Brass Corners. Rosewood, Polished.		
	6½ inch, without Plumb		" 1 10
	8 inch, with Plumb		" 2 00
	10 inch, with Plumb		" 2 40
	12 inch, with Plumb		" 2 60
No. 11.	Pocket Level. Brass, Embossed and Nickel Plated, 6 inches long, ⅝ inch square		" 1 50
No. 12.	Pocket Level. Brass, Nickel Plated, Cylindrical, with base plate, round ends, 2½ inc.		" 75
	3½ inch		" 90

GAGES.

CENTER GAGE

And Gage for Grinding and Setting Screw Tools.



Price ..... 25 cents.
No. 511. Tempered. Price ..... 35 cents.

The angles used on this gage are 60 degrees. The four divisions upon the gage of 14, 20, 24 and 32 parts to the inch are very useful in measuring the number of threads to the inch of taps and screws. The following parts to the inch can be determined by them, viz.: 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 28 and 32.

SCREW PITCH GAGE

FOR 16 PITCHES.

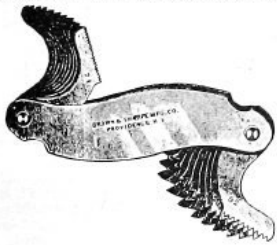
10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40.

Price ..... 75 cents

SCREW PITCH GAGE.

22 PITCHES,

INCLUDING PIPE THREAD PITCHES.



Price $1 00

DEPTH OF GEAR TOOTH GAGES.

Price, each ..... 25 cents
Made to order, each ..... 75 cents

Depth of Gear Tooth Gages for all regular pitches, from 3 to 48 pitch inclusive, are carried in stock. One gage answers for each pitch, and indicates the extreme depth to be cut.

SCREW PITCH GAGE

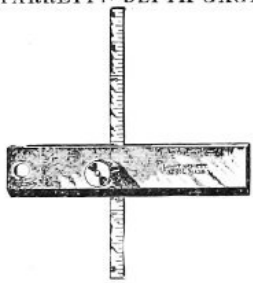
FOR 25 PITCHES.

U. S. STANDARD THREAD.

2¼, 2⅜, 2½, 2⅝, 2¾, 2⅞, 3, 3⅛, 3¼, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20, and Gage for grinding Thread Tool.

Price $1 50

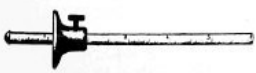
STARRETT'S DEPTH GAGE.



Has in place of the Round wire to slide in the groove a 4-inch scale, $\frac{1}{16}$ inch wide, graduated in either 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths, indicating exact measurements, and may be used separately from the gage.

Price with 4-in. stock $1.25
" " 6-in. " 1.50
" 6-in. stock with 6 in blade 1.75
" 10-in. " " 6-in blade 2.25

STARRETT'S SCRATCH GAGE.



	Graduated.	Not Graduated.
5 inch (beam $1\frac{1}{4}$ in.)	$1.00	$0.65
6 " " $\frac{5}{8}$ "	1.25	.75

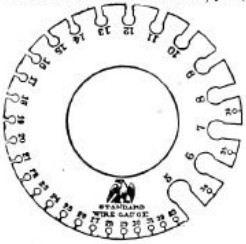
Unless otherwise ordered, we shall send those graduated in 64ths.

Two extra cutters will be sent with each gage, fastened to the case. They should last for years.

GAGES.

THE AMERICAN STANDARD WIRE GAGE.

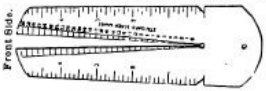
Adopted by the Brass Manufacturers, Jan., 1858.



These gages are made from the best steel, and are tempered, adjusted and warranted accurate.

Round Gages, sizes 0 to 36.....$2 50
Round Gages, sizes 5 to 36..... 2 00

LARGE SCREW AND WIRE GAGE.

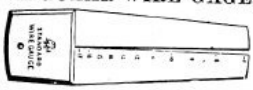


Price $3 50
Extra thick 4 50

POCKET SCREW AND WIRE GAGE.

Price $2 50

ANGULAR WIRE GAGE.



American Standard

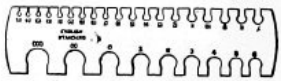
No. 754. Sizes 15 to 28..... 3 50
No. 756. Sizes 25 to 40..... 3 50
No. 757. Sizes 25 to 40, both old and new standard 5 00

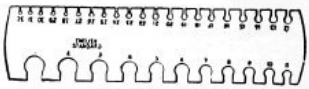
ENGLISH STANDARD WIRE GAGE.

The Same as Stubs' Wire, or Birmingham Gage.

Sizes 1 to 36.....$2 00
Sizes 6 to 36..... 1 50

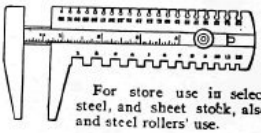
ROLLING MILL GAGES.





No. 744. Sizes 000 to 25.....$2 50
No. 746. Sizes 1 to 32..... 3 00

WIRE GAGE AND CALIPER.



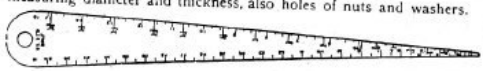
For store use in selecting iron, steel, and sheet stock, also for iron and steel rollers' use.

Price $7.00

The Wire Gage sizes are from No. 1 to 32, inclusive, old standard. The Caliper tongue is graduated to inches and 32ds, and will measure 4-inch flat, round or square stock. The jaws and Wire Gage are hardened.

NUT AND WASHER GAGE.

For measuring diameter and thickness, also holes of nuts and washers.



Price .....

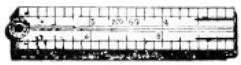
The figures upon one edge are for 16ths and 32ds, and on the other for 10ths and 20ths of an inch. Also U. S. Standard sizes for holes to tap for bolts. Opposite side is graduated the same as a steel rule to 32ds of an inch. $6.00

FOLDING STEEL RULES.

		Rules only per doz.	Rules with Leather cases, per doz.	Nickel Plated rules, per doz.
No. 70.	2 foot Folding Pocket, ¼ inch x 21 gage, 6 inch joints, 4 fold 8ths of inches on one side, 16ths on other.	$14 00	$18 00	$3 00
No. 77.	2 foot Folding Pocket, ¼ inch x 21 gage, 8 inch joints, 3 fold. Board measure, 8 ft. to 22 ft. lengths.	17 00	21 00	3 00
No. 80.	2 ft. Folding, ¼ inch x 21 gage, 12 inch joints, 2 fold 16ths of inches on one side, 8ths on other.	10 00		3 00
No. 85.	2 foot Folding, ¼ inch x 21 gage, One Stop Joint German silver ends, 8ths inches one side, 16ths on other	12 00		3 00
No. 86.	2 foot Folding, ¼ inch x 21 gage, One Stop Joint German silver ends, 16ths of inches one side, circumference inches on other.	17 00		3 00

ONE FOOT, FOUR FOLD, NARROW

BOXWOOD RULES.

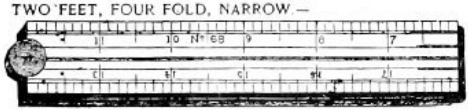


No. 55. Arch Joint, Middle Plates, 8ths and 16ths of inches, ¼ inch wide....Per dozen, $ 4 00
No. 56. Arch Joint, Edge Plates, 8ths and 16ths of inches, ¼ inch wide....Per dozen, 6 00
No. 56½. Arch Joint, Edge Plates, 8ths and 16ths of inches, ¾ inch wide....Per dozen, 7 00
No. 56½. Arch Joint, Half Bound, 8ths and 16ths of inches, ¼ inch wide....Per dozen, 10 00
No. 57. Arch Joint, Full Bound, 8ths and 16ths of inches, ⅝ inch wide....Per dozen, 12 00

No. 69. Round Joint, Middle Plates, 8ths and 16ths of inches, ⅝ inch wide....Per dozen, $3 00

No. 69½. Round Joint, Middle Plates, 8ths and 16ths of inches, 1 inch wide....Per dozen, 3 50

TWO FEET, FOUR FOLD, NARROW —

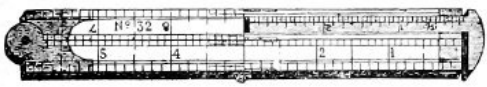


No. 68. Round Joint, Middle Plates, 8ths and 16ths of inches, 1 inch wide....Per dozen, $4 00
No. 8. Round Joint, Middle Plates, Extra Thick, 8ths and 16ths of inches, 1 inch wide.... " 4 50

TWO FEET, FOUR FOLD.—

No. 61. Square Joint, Middle Plates, 8ths and 16ths of inches, 1 inch wide....Per dozen. $ 5 00
No. 63. Square Joint, Edge Plates, 8ths, 10ths and 16ths of inches, Drafting Scales, 1 inch wide.. " 7 00
No. 84. Square Joint, Half Bound, 8ths and 16ths of inches, Drafting Scales, 1 inch wide.... " 12 00
No. 62. Square Joint, Full Bound, 8ths and 16ths of inches, Drafting Scales, 1 inch wide.... " 15 00

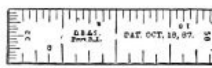
BOXWOOD CALIPER RULES.



No. 36. Square Joint, Six Inches, Two Fold, 8ths and 16ths of inches, ¼ inch wide....Per dozen, $ 7 00
No. 36½. Square Joint, One Foot, Two Fold, 8ths, 10ths, 12ths and 16ths of inches, 1¼ inches wide.. " 12 00
No. 32. Arch Joint, Edge Plates, One Foot, Four Fold, 8ths, 10ths and 16ths of inches, ¼ inch wide. " 12 00
No. 32½. Arch Joint, Bound, One Foot, Four Fold, 8ths, 10 ths, 12ths and 16ths of inches, ¼ inch wide. " 20 00

RULES AND EDGES.

STANDARD STEEL RULES.



No. 100.	1 inch long, 4 or 7 graduation.... ....Price,	$0 15
No. 102.	2 inches long, 4, 7, or 9 graduation...... "	25
No. 104.	3 inches long, 1, 2, 4, 6 or 7 graduation.. "	35
No. 106.	4 inches long, 1, 2, 4, 6 or 7 graduation.. "	45
No. 108.	6 inches long, 1, 2, 4, 6 or 7 graduation.. "	65
No. 110.	9 inches long, 1, 2, 4, 6 or 7 graduation.. "	1 00
No. 112.	12 inches long, 1, 2, 4, 6 or 7 graduation.. "	1 25
No. 114.	12 inches long, 5 graduation.............. "	2 50
No. 116.	18 inches long 1, 2, 4, 6 or 7 graduation.. "	2 00
No. 118.	24 inches long, 1, 2, 4, 6 or 7 graduation.. "	2 75
No. 120.	24 inches long, 5 graduation.............. "	5 00
No. 122.	36 inches long, 1, 2, 4, 6 or 7 graduation.. "	7 00
No. 124.	48 inches long, 1, 2, 4, 6 or 7 graduation.. "	10 00

These Rules are divided in parts of inches as follows:

	No. 1 Graduation.	No. 2 Graduation.	No. 4 Graduation.
1st cor.	10, 20, 50, 100	8	8
2d cor.	12, 24, 48	10, 20, 50, 100	16
3d cor.	14, 28	12, 24, 48	32
4th cor.	16, 32, 64	16, 32, 64	64

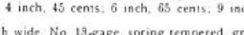
No. 5 Graduation.

	No. 5 Graduation.
1st cor.	11, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25
2d cor.	16, 32, 64
3d cor.	26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38
4th cor.	39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 100

	No. 6 Graduation.	No. 7 Graduation.	No. 9 Graduation.
1st cor.	32	16	10, 20
2d cor.	48	32	16
3d cor.	50	64	32, 64
4th cor.	64	100	50, 100

	No. 10 Graduation.	No. 11 Graduation.	No. 12 Graduation.
1st cor.	32	64	50
2d cor.	64	100	100

NARROW RULES.



Lengths: 4 inches, 6 inches, 9 inches, 12 inches.

Prices: 4 inch, 45 cents; 6 inch, 65 cents; 9 inch, $1.00; 12 inch, $1.25.

3-16 inch wide, No 18 gage, spring tempered, graduated one corner each side whole length, either in 32ds and 64ths, 50ths and 100ths, or 64ths and 100ths.

No. 330. Narrow, graduated in 32ds and 64ths.
No. 331. Narrow, graduated in 50ths and 100ths.
No. 332. Narrow, graduated in 64ths and 100ths.

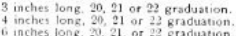
STEEL SHRINK RULES.

12 inch ....$1.75 | 24 inch $3.50

These rules are spring tempered, except No. 372, and are of the same width and thickness as Spring Tempered Standard Rules.

No. 370. Shrink, 1/8 to foot, No. 4 graduation.
No. 371. Shrink, 1/8 to foot, No. 2 graduation.
No. 372. Shrink, 1/8 to foot, Flexible, graduated in 32ds & 64ths.
No. 373. Shrink and Standard, 1/8 to foot, No. 4 graduation.
No. 375. Brass Shrink, 3-16 to foot, No. 4 graduation.
No. 376. Brass Shrink, 3-16 to foot, No. 2 graduation.
No. 377. Double Shrink, 1/4 to foot, No. 4 graduation.
No. 378. Double Shrink, 1/4 to foot, No. 2 graduation.

TRIANGULAR STEEL RULES.

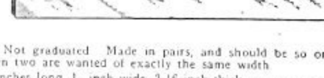


No. 240.	3 inches long, 20, 21 or 22 graduation... Price,	$0 50
No. 242.	4 inches long, 20, 21 or 22 graduation... "	70
No. 244.	6 inches long, 20, 21, or 22 graduation... "	1 00
No. 246.	12 inches long, 20, 21 or 22 graduation... "	2 00

These Rules are divided in parts of inches as follows:

	No. 20 Graduation.	No. 21 Graduation.	No. 22 Graduation.
1st cor.	16	16	12, 24, 48
2d cor.	64	32	20, 50, 100
3d cor.	100	64	16, 32, 64

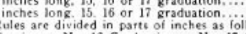
STEEL STRAIGHT EDGES



Not graduated. Made in pairs, and should be so ordered when two are wanted of exactly the same width.

12 inches long, 1 inch wide, 3-16 inch thick..............	$1.20
18 inches long 1¼ inch wide, 3-16 inch thick..............	1.80
24 inches long, 1½ inch wide, 3-16 inch thick..............	2.40
36 inches long, 2 inches wide, ¼ inch thick..............	5.00
48 inches long, 2½ inches wide, ¼ inch thick..............	8.00

SQUARE STEEL RULES.

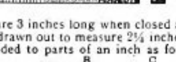


No. 230.	3 inches long, 15, 16 or 17 graduation....Price,	$0 45
No. 232.	4 inches long, 15, 16 or 17 graduation.... "	60
No. 234.	6 inches long, 15, 16 or 17 graduation.... "	90

These Rules are divided in parts of inches as follows:

	No. 15 Graduation.	No. 16 Graduation.	No. 17 Graduation.
1st cor.	8	16	16
2d cor.	16	32	50
3d cor.	32	64	64
4th cor.	64	100	100

STEEL CALIPER RULES.



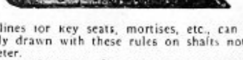
These Rules are 3 inches long when closed and 1/8 inch thick. The Slide can be drawn out to measure 2¼ inches.

They are divided to parts of an inch as follows:

	A	B	C	D
1st cor.	8, 14, 28	8, 14, 28	8	8
2d cor.	12, 24, 48	12, 24, 48	16	16
3d cor.	16, 32, 64	16, 32, 64	32	32
4th cor.	20, 50, 100	20, 50, 100	64	64
Slide,	64 & 32	64 & 100	32 & 64	64 & 100

PRICE, $2.00.

KEY SEAT RULES.

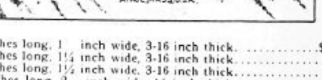


Parallel lines for key seats, mortises, etc., can be readily and accurately drawn with these rules on shafts not less than 7/8 inch diameter.

The edges are beveled. One edge is graduated into 16ths, and the other into 32ds of an inch.

No. 254.	4 inches long.............................Price,	$2 50
No. 256.	6 inches long............................. "	3 00
No. 258.	8 inches long............................. "	3 75

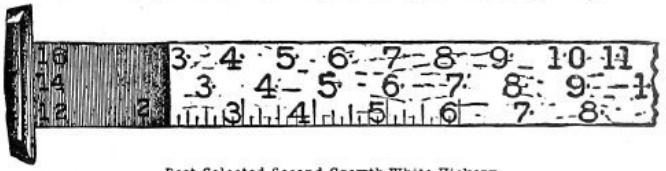
BEVELED STRAIGHT EDGES.



12 inches long, 1 inch wide, 3-16 inch thick..............	$1 50
18 inches long, 1¼ inch wide, 3-16 inch thick..............	2 50
24 inches long, 1½ inch wide, 3-16 inch thick..............	3 50
36 inches long, 2 inch wide, ¼ inch thick..............	6 00
48 inches long, 2½ inches wide, ¼ inch thick..............	10 00

One edge only is beveled, and this to 1-16 inch thick, from ½ to ¾ inch back.

HICKORY BOARD RULES (Burnt Figures).



Best Selected Second Growth White Hickory.

No. 1. 3 tier, 3½ feet, 1⅛ inches wide, extra heavy brazed heads, steel caps and brass shoulders, per doz. $27.00
No. 2. 3 tier, 3 feet, 1⅛ inches wide, same style as No. 1, except in length ..... per doz., 25.00
No. 2N. 3 " 3 " 1 " " " as No. 2, except in width ..... " 25.00
No. 2½. 3 " 2½ " sorting rule, same as No. 2, but shorter and stiffer ..... " 24.00
No. 3. 3 " 3 " 1⅛ inches wide, same as No. 2, except brass shoulder is ½ inch shorter, " 23.00
No. 4. 3 " 3 " 1⅛ " " with cast steel head ..... " 21.00
No. 6. 3 " 3 " 1⅛ " " brazed head, same as No. 2, but has 6 inch brass plate graduated to 16ths ..... per doz., 27.00
No. 6N. 3 tier, 3 feet, 1 inch wide, same as No. 2, except in width ..... " 27.00
No. 8. 4 " 3 " 1¼ " " brazed head ..... " 25.00
No. 10. 5 " 3 " 1½ " " " " ..... " 30.00
No. 13. 4 " 3 " combined board and log rule, brazed head ..... " 28.00

Above rules marked one side to measure 12 to 16 feet. In ordering, state whether you want opposite side 8, 10, 18 or 18, 20, 22 feet.

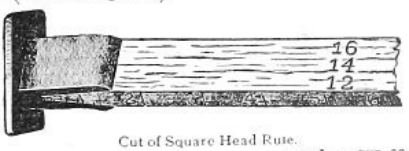
Full length of rules given above, including 6 inch handle, patent diamond head board rules, best tempered steel, add $2.00 to above list.

SPRING STEEL BOARD RULES.

No. 51. 3½ feet, 3 tier ..... per doz., $42.00
No. 52. 3 " 3 " ..... " 36.00
No. 52½. 2½ " 3 " ..... " 33.00
No. 58. 3 feet, 4 tier ..... per doz., $39.00
No. 59. 3 " 5 " ..... " 42.00
Diamond Head, extra ..... " 2.00

HICKORY LOG RULES (Burnt Figures).

Made with any scale desired. Doyle, Scribner, Doyle-Scribner combined, and decimal scales are regular; all other scales are special. In ordering, always state what scale, also whether 8 to 20 or 12 to 24 is wanted.



Cut of Square Head Rule.

No. 14. Square head, figured 48 inches, 8 inch handle ..... per doz., $27.00
No. 15. " " " 36 " 8 " " ..... " 23.00
No. 22. "T" " " 48 " 8 " " ..... " 27.00
No. 19. Plain " " 48 " 8 " " ..... " 25.00
No. 16. Solid hook, " 48 " 8 " " ..... " 27.00
No. 17. Detachable hook, " 48 " 8 " " ..... " 28.00
No. 16½. Flat steel " " 48 " 8 " " ..... " 28.00
No. 18. Double "T" " " 48 " 8 " " ..... " 29.00
No. 21. Pick and " " 48 " 8 " " ..... " 29.00

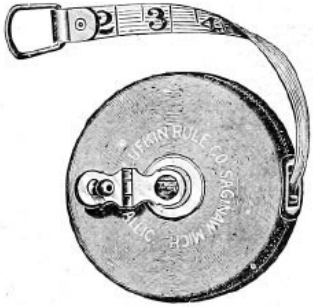
SQUARE LOG RULES.

No. 23. 1 inch square, no head ..... per doz., $24.00 | No. 24. 1 inch square, with head ..... per doz., $30.00
Both 3 tiers each side, figured 48 inches, full length.

LUMBER GAUGES.

For measuring the thickness of lumber.

No. 0. Measures 1, 1¼, 1½, 1¾, 2 inches ..... per doz., $6.00
No. 00. " ⅝, ¾, 1, 1¼, 1½, 2 inches ..... " 6.00
No. 000. " ⅝, ¾, 1, 1¼, 1½, 2, 2½ inches ..... " 5.50



METALLIC MEASURING TAPES.

Folding handle.

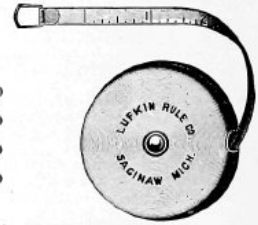
Tape ⅝ inch wide, made of best woven linen with metallic warp. Hard leather cases, brass folding handles and brass trimmings.

Length.	Marked one side only. 12ths.	Per doz.	Marked both sides 12ths & links	Marked both sides 10ths & links.	Per doz.
25 ft	No. 500	$20 40	No. 500 L	No. 500 DL	$21 60
33 "	No. 501	24 00	No. 501 L	No. 501 DL	25 20
40 "	No. 502	26 40	No. 502 L	No. 502 DL	27 60
50 "	No. 503	30 00	No. 503 L	No. 503 DL	31 20
66 "	No. 504	33 60	No. 504 L	No. 504 DL	36 00
75 "	No. 505	37 20	No. 505 L	No. 505 DL	39 60
100 "	No. 506	46 80	No. 506 L	No. 506 DL	50 40

POCKET STEEL TAPES.

Nickel plated cases, spring wind, with center stop.

No. 143. 36 inches, ¼ inch Tape, marked inches and 1-16ths, per doz..... $ 7 00
No. 145. 60 inches, ¼ inch Tape, marked inches and 1-16ths, per doz..... 9 00
No. 146. 72 inches, ¼ inch Tape, marked inches and 1-16ths, per doz..... 10 00
No. 148. 96 inches, ¼ inch Tape, marked inches and 1-16ths, per doz..... 14 00

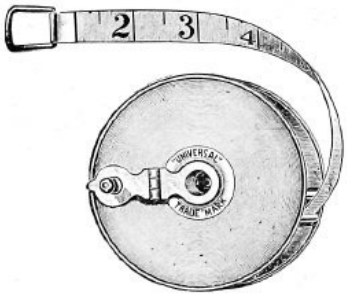


POCKET LINEN TAPES.

Nickel plated cases, spring wind, with center stop.

With ¼ inch enameled linen tape, marked one side inches and eighths.

No. 173. 36 inches..... per doz., $3 50
No. 175. 60 " ..... " 4 50
No. 176. 72 " ..... " 5 00

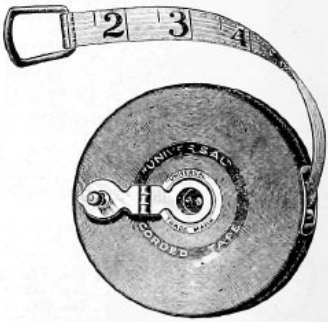


"UNIVERSAL" ASS SKIN MEASURING TAPES.

With ½ inch cotton tape.

Brass bound cases, brass folding handles and trimmings.

No.	710	711	712	713	714	715	716
Length, feet...	25	30	40	50	66	75	100
Per doz.....	$3 75	4 00	4 50	5 00	6 00	7 50	9 00



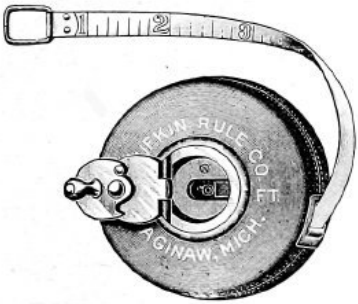
"UNIVERSAL" MEASURING TAPES.

Bend leather case.

With ½ inch linen corded tape.

Cases russet leather, nicely finished in natural color. Brass folding handles and trimmings.

No.	930	931	932	933	934	935	936
Length, feet...	25	30	40	50	66	75	100
Per doz.....	$11 00	12 00	13 00	14 00	15 00	16 00	18 00



"RELIABLE" STEEL MEASURING TAPES.

With double folding flush handle, opened by pressing small pin or button on opposite side. Hard leather cases. Nickel plated trimmings. Measurements guaranteed perfectly accurate.

With 3-8 inch Tapes.

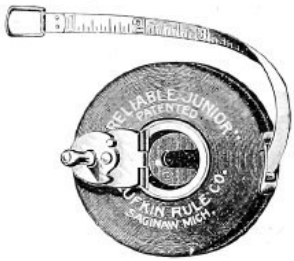
Marked feet and 12ths (inches and eighths).	Marked feet, 10th and 100ths of feet, for Surveyors' use.	Length.	Diameter of Case.	Each.	Extra for Nickel Plated Tapes.
No. 200	No. 200 D	25 ft.	2¾ in.	$ 4 50	$1 00
No. 201	No. 201 D	33 "	2¾ "	5 20	1 00
No. 202	No. 202 D	40 "	3¼ "	6 00	1 50
No. 203	No. 203 D	50 "	3¼ "	7 20	1 50
No. 204	No. 204 D	66 "	3½ "	9 20	1 75
No. 205	No. 205 D	75 "	4⅛ "	10 40	1 75
No. 206	No. 206 D	100 "	4½ "	12 80	2 00

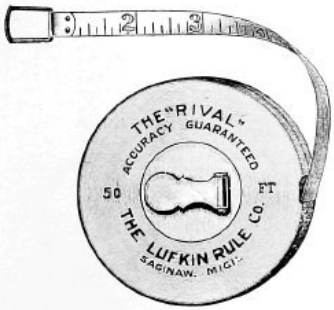
"RELIABLE JUNIOR" STEEL MEASURING TAPES.

With double folding flush handle, opened by pressing small pin or button on opposite side. Hard leather cases. Nickel plated trimmings. Measurements guaranteed perfectly accurate.

With 1-4 inch Tapes.

Marked feet and 12ths (inches and sixteenths).	Marked feet, 10ths and 100ths of feet, for Surveyors' use.	Length.	Diameter of Case.	Per dozen.
No. 100	No. 100 D	25 ft.	2¼ in.	$45 00
No. 103	No. 103 D	50 "	2¾ "	55 00

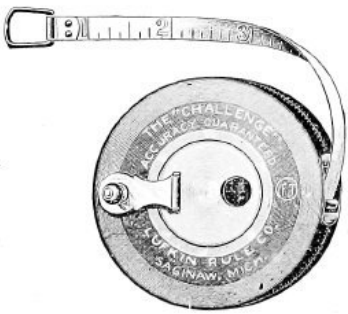




"RIVAL" STEEL MEASURING TAPES.

Nickel plated steel cases, flush handle, ¾ inch tapes, marked one side only in tenths or twelfths.

Marked feet and 12ths (inches and eighths).	Marked feet, 10ths and 100ths of ft., for Surveyors' use.	Length.	Per dozen.
No. 240	No. 240 D	25 ft.	$33 00
No. 243	No. 243 D	50 "	40 80
No. 245	No. 245 D	75 "	54 00
No. 246	No. 246 D	100 "	69 00



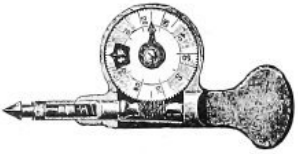
"CHALLENGE" STEEL MEASURING TAPES.

Hard leather cases, nickel plated trimmings, flush handle. ¾ inch tape, marked one side only, in tenths or twelfths.

Marked feet and 12ths (inches and eighths).	Marked feet, 10ths and 100ths of ft., for Surveyors' use.	Length.	Diameter of Case.	Per dozen.
No. 260	No. 260 D	25 ft.	2¾ in	$39 00
No. 263	No. 263 D	50 "	3¼ "	48 00
No. 265	No. 265 D	75 "	4¼ "	63 00
No. 266	No. 266 D	100 "	4½ "	81 00

SPEED INDICATORS.

TABOR SPEED INDICATOR.

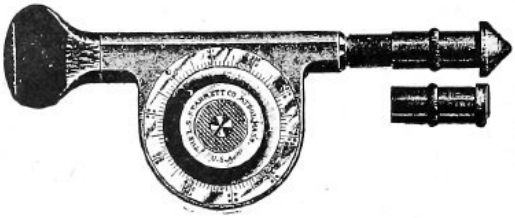


Price.....each, $1.00

WEISS DOUBLE SPEED ALARM INDICATOR.

The bell rings when either hand is at zero, and at every hundred revolutions of the spindle. Price each, **$1.35**

STARRETT'S IMPROVED SPEED INDICATOR.



This instrument is nickel-plated, and has a rosewood handle so that it will not heat the fingers when run at high speed. Has rubber tips for both pointed and hollow centers.
In pasteboard box.....$1.50 In leatherette case.....

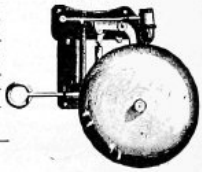
GONGS.

TRIP HAMMER.

SIZE.....Inches	4	5	6	7	8	9	10
Trip Hammer Gong, Pol.....Each	2.45	2.95	3.70	4.60	5.60	6.70	7.90
Locomotive " ..... "	3.15	3.65	4.30	5.75	6.75	.....	9.00

SIZE.....Inches	11	12	13	14	15	16
Trip Hammer Gong, Pol Each	9.25	11.00	12.90	15.00	18.50	23.00
Locomotive " ..... "	.....	15.00	21.00	.....	35.00	....

LOCOMOTIVE.



ENGINE BELLS.

SIZE.....Inches	3½	4	4½	5	5½	6	6½	7	8	9	10
Figure 537-Plain.....Each	$1.75	2.00	2.25	2.50	3.00	3.75	4.50	5.75	7.00	8.50	10.00

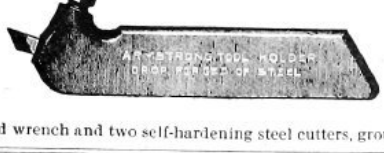
GONG PULLS.

FIG. 538.

FIG. 539.

Figure 538	Flat, 15 inches long, Malleable Iron, Brass Handle.....	Each	$1.25
	Round Iron, 22 inches long, Polished Brass Handle and Slide.....	"	2.00
Figure 539	7 inches long, Polished Brass.....	Each	.75
	9 " " " "	"	1.25

ARMSTRONG PATENT TOOL HOLDERS.

STRAIGHT-SHANK  TOOL HOLDERS.

Complete with drop forged wrench and two self-hardening steel cutters, ground to shape.

LEFT-HAND OFF-SET TOOL.

No.	Size of Holder. Inches.	Size of Cutter. In. Sq.	Weight. Lbs. Oz.	Price. Complete.	Extra Cutters. Each.
00	$\frac{5}{16}$ x $\frac{5}{8}$ x $4\frac{1}{2}$	$\frac{3}{16}$	0 7	$1.60	$ .10
0	$\frac{3}{4}$ x $\frac{3}{4}$ x 5	$\frac{1}{4}$	0 12	1.65	.12
1	$\frac{1}{2}$ x 1 x 6	$\frac{5}{16}$	1 4	1.80	.18
2	$\frac{5}{8}$ x $1\frac{1}{4}$ x 7	$\frac{3}{8}$	2 0	2.30	.25
3	$\frac{3}{4}$ x $1\frac{1}{2}$ x 8	$\frac{7}{16}$	3 4	3.00	.35
4	$\frac{7}{8}$ x $1\frac{5}{8}$ x 9	$\frac{1}{2}$	4 8	3.80	.45
5	1 x $1\frac{1}{4}$ x 11	$\frac{5}{8}$	7 8	4.75	.65
6	$1\frac{1}{4}$ x 2 x 13	$\frac{3}{4}$	11 8	7.00	1.00
7	$1\frac{1}{2}$ x $2\frac{1}{4}$ x 16	$\frac{7}{8}$	19 8	12.00	1.75
750	$1\frac{5}{8}$ x $2\frac{1}{2}$ x 18	1	25 0	17.50	2.50
800	$1\frac{1}{4}$ x $2\frac{1}{4}$ x 20	$1\frac{1}{8}$	37 0	23.00	3.25

RIGHT-HAND OFF-SET TOOL.

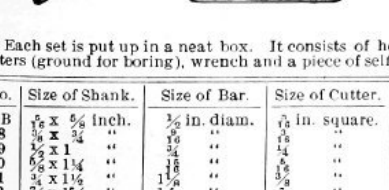
OFF-SET TOOL HOLDERS.

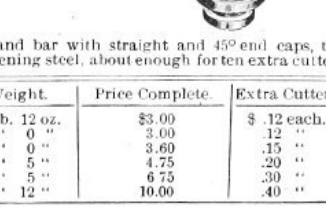
Complete with drop forged wrench and two self-hardening steel cutters, ground to shape.

No. Right or Left.	Size of Holder. Inches.	Size of Cutter. In. Sq.	Weight. Lbs. Oz.	Price. Complete.	Extra Cutters. Each.
00	$\frac{5}{16}$ x $\frac{5}{8}$ x 5	$\frac{3}{16}$	0 8	$1.60	$ .10
0	$\frac{3}{8}$ x $\frac{3}{4}$ x 6	$\frac{1}{4}$	0 14	1.65	.12
1	$\frac{1}{2}$ x 1 x 8	$\frac{5}{16}$	1 10	1.80	.18
2	$\frac{5}{8}$ x $1\frac{1}{4}$ x 9	$\frac{3}{8}$	2 8	2.30	.25
3	$\frac{3}{4}$ x $1\frac{1}{2}$ x 10	$\frac{7}{16}$	4 0	3.00	.35
4	$\frac{7}{8}$ x $1\frac{5}{8}$ x 11	$\frac{1}{2}$	5 10	3.80	.45
5	1 x $1\frac{1}{4}$ x $12\frac{1}{2}$	$\frac{5}{8}$	8 4	4.75	.65
6	$1\frac{1}{4}$ x 2 x 15	$\frac{3}{4}$	12 8	7.00	1.00
7	$1\frac{1}{2}$ x $2\frac{1}{4}$ x 20	$\frac{7}{8}$	21 4	12.00	1.75
750	$1\frac{5}{8}$ x $2\frac{1}{2}$ x 22	1	30 0	17.50	2.50
800	$1\frac{1}{4}$ x $2\frac{1}{4}$ x 24	$1\frac{1}{8}$	41 0	23.00	3.25

NOTE.—In ordering always specify whether right or left hand is wanted. We will always send straight shank, as listed above, if right or left is not mentioned.

BORING TOOL.





Each set is put up in a neat box. It consists of holder and bar with straight and 45° end caps, two cutters (ground for boring), wrench and a piece of self-hardening steel, about enough for ten extra cutters.

No.	Size of Shank.	Size of Bar.	Size of Cutter.	Weight.	Price Complete.	Extra Cutters.
00B	$\frac{5}{16}$ x $\frac{5}{8}$ inch.	$\frac{1}{2}$ in. diam.	$\frac{3}{16}$ in. square.	1 lb. 12 oz.	$3.00	$ .12 each.
8	$\frac{3}{8}$ x $\frac{3}{4}$ "	$\frac{5}{8}$ "	$\frac{1}{4}$ "	2 " 0 "	3.00	.12 "
9	$\frac{1}{2}$ x 1 "	$\frac{3}{4}$ "	$\frac{1}{4}$ "	4 " 0 "	3.60	.15 "
10	$\frac{5}{8}$ x $1\frac{1}{4}$ "	$\frac{7}{8}$ "	$\frac{5}{16}$ "	7 " 5 "	4.75	.20 "
11	$\frac{3}{4}$ x $1\frac{1}{2}$ "	$1\frac{1}{16}$ "	$\frac{3}{8}$ "	12 " 5 "	6 75	.30 "
12	$\frac{7}{8}$ x $1\frac{5}{8}$ "	$1\frac{5}{16}$ "	$\frac{7}{16}$ "	17 " 12 "	10.00	.40 "

ARMSTRONG PATENT TOOL HOLDERS—

THREADING TOOLS.

The shank of tool is drop forged of steel and case hardened. The cutters used require grinding on the top edge only, to sharpen, and therefore always remain true to form and of correct angle; its use thus insures perfect fitting threads, and saves much grinding, as well as dispensing entirely with forging and tempering. The cutters are backed off to afford proper clearance. This clearance cannot be obtained in a round cutter. The back of cutter is eccentric in form and bears upon a hardened top screw. This arrangement allows of positive and accurate adjustment.

Complete with drop forged wrench and one single point cutter.

No.	Size Shank.	Price Complete with V or U. S. Standard Cutter.	Price Complete with Whitworth Cutter.
00T	⅝ x ⅝x5 in.	$2 25	$2.50
50	¾ x ¾x5 "	2 25	2 50
51	1 x1 x6 "	2 75	3.10
52	1¼x1¼x7 "	3 50	4.00
53	1½x1½x8 "	4 50	5.00

NOTE—In ordering tools equipped with U. S. or Whitworth cutters be careful to specify exact pitch desired. Tools equipped with single point Sharp V cutter will always be shipped unless otherwise specified.

PRICE LIST OF CUTTERS.

For Tool No.	00T and 50		51		52		53	
	Single Point.	Chaser.	Single Point.	Chaser.	Single Point.	Chaser.	Single Point.	Chaser.
Sharp V	$0.45	$0.90	$0.55	$1.05	$0.70	$1.20	$0.90	$1.30
U. S. Standard	.50	.90	.60	1.05	.75	1.20	.95	1.30
Whitworth	.75	1.25	.90	1.40	1.15	1.65	1.40	1.80

LIST OF CUTTERS FURNISHED.

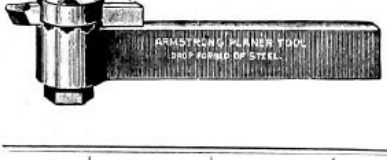
We make and carry in stock single point and chasing cutters to cut the pitches listed beneath in sharp V, Whitworth and U. S. Standards.

NOTE—When ordering cutters for U. S. or Whitworth standards it is necessary to specify exact pitch or number of threads per inch.

Chaser Cutters.		Single Point Cutters.	
No.	Pitches.	No.	All Standard Pitches.
00T and 50	14, 16, 18, 20, 24*	00T and 50	6 to 20 inclusive
51	11½*, 12, 13, 14, 16, 18, 20, 24*	51	5 to 20 inclusive
52	8, 10, 11, 11½*, 12, 13, 14, 16, 18, 20	52	4 to 20 inclusive
53	8, 10, 11, 11½*, 12, 13, 14, 16, 18, 20	53	3 to 20 inclusive

*Made in V thread only.

ARMSTRONG PATENT TOOL HOLDERS—



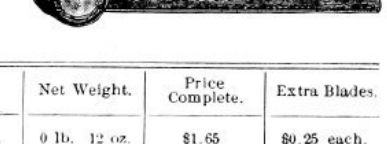
PLANER TOOL.

Each tool is packed in a neat box, and the following price includes two self-hardening steel cutters ground to shape and a drop forged wrench carefully fitted.

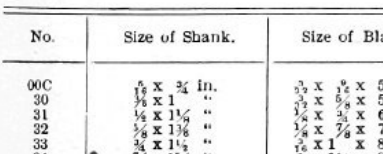
No.	Size Shank.	Length.	Size Cutter.	Weight.	Price Complete.	Extra Cutters.
40	1/2 x 1 in.	7 in.	1/4 x 3/8 in.	2 lbs. 0 oz.	$ 2.75	$0.20 each.
401	5/8 x 1 1/4 "	8 1/2 "	5/16 x 7/16 "	3 " 0 "	3.50	.30 "
41	3/4 x 1 1/4 "	10 "	3/8 x 1/2 "	4 " 11 "	4.50	.40 "
42	1 1/8 x 1 1/2 "	13 "	1/2 x 3/4 "	10 " 9 "	7.00	.70 "
43	1 3/8 x 1 3/4 "	16 "	5/8 x 7/8 "	18 " 13 "	11.00	1.00 "
44	1 7/8 x 2 "	20 "	3/4 x 1 "	32 " 8 "	16.00	2.00 "
45	2 1/8 x 2 3/4 "	24 "	7/8 x 1 1/8 "	50 " 0 "	25.00	3.00 "

STRAIGHT SHANK CUTTING-OFF TOOL.

Complete with drop forged wrench and one self-hardening steel blade.



No.	Size of Holder.	Size of Blades.	Net Weight.	Price Complete.	Extra Blades.
20	3/8 x 1 x 5 in.	3/32 x 5/8 x 5 1/4 in.	0 lb. 12 oz.	$1.65	$0.25 each.
21	1/2 x 1 1/8 x 6 "	1/8 x 3/4 x 6 1/2 "	1 " 5 "	1.80	.35 "
22	5/8 x 1 3/8 x 7 "	1/8 x 7/8 x 7 1/2 "	2 " 2 "	2.30	.45 "
23	3/4 x 1 1/2 x 8 "	3/16 x 1 x 8 1/2 "	3 " 4 "	3.00	.60 "
24	7/8 x 1 5/8 x 9 "	3/16 x 1 1/4 x 9 1/2 "	4 " 8 "	3.80	.75 "
25	1 " x 1 7/8 x 10 "	1/4 x 1 1/4 x 10 1/2 "	6 " 8 "	4.75	.95 "
26	1 1/8 x 2 x 11 "	1/4 x 1 3/8 x 11 1/2 "	8 " 5 "	6.50	1.25 "



OFF-SET CUTTING-OFF TOOL.

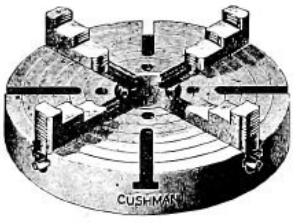
Complete with drop forged wrench and one self hardening steel blade.

No.	Size of Shank.	Size of Blades.	Weight.	Price Complete.	Extra Blades.
00C	1/8 x 3/4 in.	3/32 x 1/2 x 5 in.		$1.65	$0.25 each.
30	3/8 x 1 "	3/32 x 5/8 x 5 1/2 "	1 lb 0 oz.	1.65	.25 "
31	1/2 x 1 1/4 "	1/8 x 3/4 x 6 1/2 "	1 " 8 "	1.80	.35 "
32	5/8 x 1 3/8 "	1/8 x 7/8 x 7 1/2 "	2 " 8 "	2.30	.45 "
33	3/4 x 1 1/2 "	3/16 x 1 x 8 1/2 "	4 " 0 "	3.00	.60 "
34	7/8 x 1 5/8 "	3/16 x 1 1/4 x 9 1/2 "	5 " 4 "	3.80	.75 "
35	1 " x 1 7/8 "	1/4 x 1 1/4 x 10 1/2 "	7 " 8 "	4.75	.95 "
36	1 1/8 x 2 "	1/4 x 1 3/8 x 11 1/2 "	9 " 8 "	6.50	1.25 "

CHUCKS.—

CUSHMAN PATENT 4-JAW INDEPENDENT CHUCK.

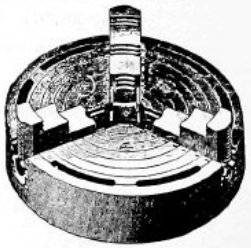
REVERSIBLE JAWS.



Size.	Size of Hole.	Size of Face-Plate Recess.	Price
4½"	1 "	4 1/16"	$14 00
6	1¼	5 1/16	18 00
8	1⅞	4¾	22 00
9	1⅞	4¾	24 00
10	2	4¾	26 00
12	2⅞	6 1/16	30 00
14	3	6 1/16	34 00
15	3	6 1/16	35 00
16	3	6 1/16	38 00
18	4	7 3/16	44 00
20	4	7 3/16	50 00
21	4	7 3/16	55 00
22	4¼	9½	57 00
24	4¾	9½	65 00
26	4¾	9½	80 00

WESTCOTT PATENT SCROLL COMBINATION LATHE CHUCK.

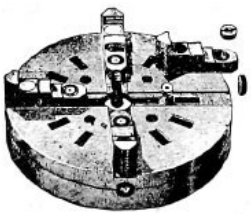
Diam. over all.	Will hold inside of Jaws.	Diam. of Recess for Face Plate.	Three Jaws. Price.	Four Jaws. Price.	Unfinished Face Plates.
*4 1/16"	5½"		$24 00	$30 00	
*6	6½		25 00	31 00	
7½	8	3½"	26 00	32 00	$ 0 25
10⅛	12	4 7/16	34 00	42 00	50
13¼	15	5 9/16	44 00	56 00	75
16	18	6¾	52 00	64 00	1 00
18½	21½	7 9/16	62 00	75 00	1 50
21½	25	9½	80 00	95 00	2 00
24	30	10	100 00	120 00	3 00
30	36	12¾	170 00	200 00	4 00
36	43	15	230 00	285 00	5 00



*The 4 1/16 and 6 inch Chucks we are now manufacturing of malleable iron, thus making them, without doubt, the strongest small chucks in the market.

WESTCOTT GEARED COMBINATION LATHE CHUCK.

INDEPENDENT, UNIVERSAL, ECCENTRIC, JAWS REVERSIBLE.

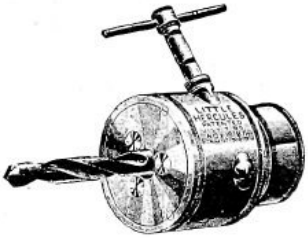


Diameter.	Capacity.	Diam. of recess for Face Plate.	Three Jaws.	Four Jaws.	Unfinished face-plate Castings.
5	5 "	3 "	$24 00		$ 0 25
7½	7½	3½	26 00	$32 00	30
10⅛	10⅛	5½	34 00	42 00	75
13	13⅛	6½	44 00	56 00	1 00
15¼	17	7½	52 00	64 00	1 50
18	19¾	8	62 00	75 00	2 00
21	25½	8	80 00	95 00	2 00
24	28	10	100 00	120 00	3 00
30	32½	15	170 00	200 00	5 00
36	40	15	230 00	285 00	5 00

Made with either three or four Jaws.
Jaws in 30 inch and 36 inch are not made to reverse unless so ordered.

CHUCKS.–

LITTLE HERCULES DRILL CHUCK.



No.	Diameter.	Holding Drill.	Price.
1	1⅛ inch.	0 to 1/16 inch.	$ 7.00
1½	2⅛ "	0 to ⅛ "	8.00
2	2¾ "	0 to 5/16 "	9.00
3	3½ "	0 to 1/2 "	10.00
4	4 "	0 to 1 1/16 "	11.00

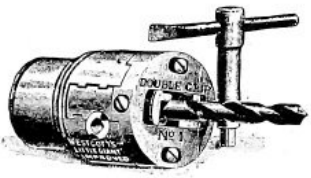
EXTRA PARTS.

SIZE.	SCREW.	RING.	JAWS PER SET.
1	$ .40	$ .60	$2.00
1½	.50	.80	2.50
2	.60	1.00	2.85
3	.75	1.25	3.35
4	.75	1.25	3.50

WESTCOTT'S LITTLE GIANT IMPROVED DOUBLE GRIP DRILL CHUCK.

EXTRA STRONG SCREWS.

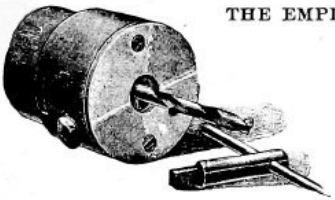
No.	Approximate Diameter.	HOLDING DRILLS.	PRICE.
0	2½ inch.	0 to 1/2 inch.	$ 8.00
1	3 "	0 to 3/4 "	9.00
2	3½ "	0 to 1 "	10.00
2½	4 "	0 to 1 " ex. strong.	11.00
3	6 "	0 to 1½ "	18.00
4	6½ "	0 to 2 "	20.00



EXTRA PARTS FOR LITTLE GIANT DRILL CHUCK.

No.	Screws.	Jaws per Set.	No.	Screws.	Jaws per Set.
00	$1.00	$2.00	2½	$1.50	$3.50
0	1.00	2.25	3	2.50	5.60
1	1.00	2.50	4	3.00	6.65
2	1.10	2.75	5	3.50	8.60

THE EMPIRE FRICTION CHUCKS.



PRICE LIST.

List Nos.	Diameter.	Capacity.	Price Each.
6	1¼ inch.	0— ¼ inch.	$ 5.00
7	2¼ "	0— ½ "	6.00
8	3 "	0— ¾ "	7.00
9	3¾ "	0—1 "	8.00
10	5¼ "	0—1½ "	17.00
11	6 "	0—2 "	19.00

CHUCK ARBORS.

SHANK FOR BLACKSMITHS' DRILL PRESSES.

⅛, 5/16 ¼ inch,..... 50 cents.

BIT BRACE ARBOR.

Price..... 50 cents.

ARBOR WITH NUT.

By turning nut one way, Chuck may be forced off of arbor, and by turning it the other way, arbor may be drawn out of socket.

Price,..... $1.25

MORSE TAPER ARBORS.

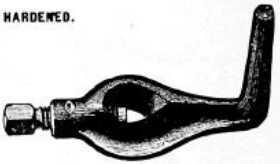
No. 1,..... $1.00
No. 2,..... 1.00
No. 3,..... 1.25
No. 4,..... 1.50
No. 5,..... 2.00

DROP FORGED LATHE DOGS.

STEEL SCREWS, U. S. STANDARD GAGE POINTS, HARDENED.

PRICE LIST.

Size Dog	¾	½	¾	1	1¼	1½	1¾	2	2½	3	3½	
Price, each	$0.50	.60	.70	.80	.95	1.10	1.25	1.40	1.60	1.80	2.00	2.30
Diam. Screw	5/16	3/8	7/16	1/2	5/8	7/8	7/8	1	1 1/4	1 3/4	1 7/8	2 1/4
Length, Screw	1 1/8	1 1/2	1 5/8	2	2 1/2	2 3/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4
Ext. Screws, each	$0.05	.06	.07	.08	.09	.10	.12	.18	.20	.22	.33	.35



LIGHT STEEL DOG.

With Steel Screws. U. S. Standard. Points Hardened.

No.	Inch.	Price each	No.	Inch.	Price each.
1	¾	$0 35	7	1¾	$1 00
2	½	35	8	2	1 10
3	¾	50	9	2½	1 40
4	1	60	10	3	1 50
5	1¼	75	11	3½	1 70
6	1½	85	12	4	1 90

HEAVY STEEL DOG.

With Steel Screws. U. S. Standard and the Points Hardened.

This Dog has a very heavy Boss, so that if the thread wears, a heavier screw can be substituted.

No.	Inch.	Price Each.	No.	Inch.	Price Each.
1	¾	$0 40	13	2½	$1 35
2	½	50	14	2¾	1 45
3	⅞	60	15	3	1 60
4	¾	60	16	3½	1 80
5	⅞	70	17	4	2 10
6	1	70	18	4½	2 75
7	1¼	80	19	5	3 25
8	1¼	80	Full set of 19		23 60
9	1⅜	95	20 (extra)	5½	4 00
10	1½	95	21 "	6	5 00
11	1⅝	1 10	22 "	7	6 00
12	2	1 20	23 "	8	7 00

One small set of 8 by ¼ inch to 2 inches..... 6 25

One set of 12 by ⅛ inch to 2 inches, continued by ¼ inch to 4 inches....13 20

STRAIGHT TAIL DOG.

Steel Set Screws, U. S. Standard Gage, Points Hardened.

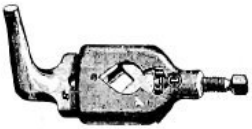
No.	Inch.	Price Each.	No.	Inch.	Price Each.
1	¾	$0 60	11	2½	$1 45
2	⅞	70	12	3	1 60
3	1	70	13	3½	1 80
4	1¼	80	14	4	2 10
5	1½	80	15	4½	2 75
6	1⅜	95	16	5	3 25
7	1¼	95	17	5½	4 00
8	1½	1 10	18	6	5 00
9	2	1 20	19	7	6 00
10	2½	1 35	20	8	7 00

One Set to 2 inch, $7.80. Full Set, $44.10.

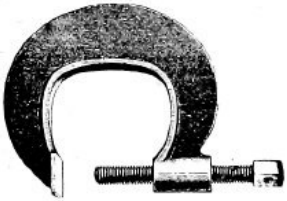
DIE DOG.

PRICE LIST

No. 1. 1¼ inch between sides	$3 00
Extra Dies, per pair	50
No. 2. 2 inch between sides	4 00
Extra Dies, per pair	75
Screws	10

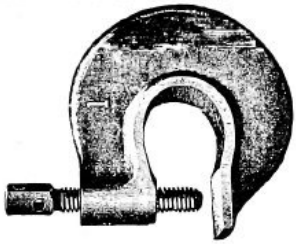


LIGHT STEEL BOILER CLAMP.



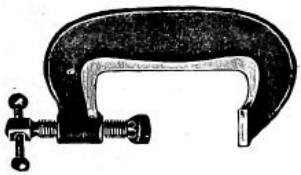
No. 0. Opens 2¼ inches, runs back 2½ inches	$2 00
No. 1. Opens 4 inches, runs back 4½ inches	4 00

STEEL BOILER CLAMP.—EXTRA HEAVY.



No. 1	2 inch	$3 00	
No. 2	3 "	4 00	
No. 3	4 "	5 00	
No. 4	5 "	6 00	
No. 5.	6 inch		$7 50
No. 6.	8 "		8 50
No. 7.	10 "		10 00

HEAVY STEEL CLAMP.



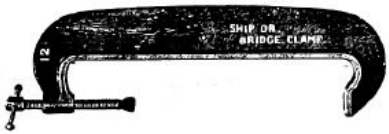
Extra heavy, with button on end of screw, hung on a ball so as to accommodate itself to irregularities without bending the screw. The foot of the clamp is planed.

The back is 2¼ inches from center of screw.

No.		Price.	No.		Price.
1.	Opening to 2 in.	$1 75	7.	Opening to 10 in.	$3 75
2.	" 3 "	2 00	8.	" 12 "	4 25
3.	" 4 "	2 25	9.	" 14 "	5 00
4.	" 5 "	2 50	10.	" 16 "	6 00
5.	" 6 "	2 75	11.	" 18 "	7 00
6.	" 8 "	3 25			

Full Set, 11 sizes, $40.50

STEEL BRIDGE CLAMP.



The screw is heavy and has button on the end.

No. 12.	Opens 24 inches	Price, $12 00
No. 13.	Opens 30 inches	" 16 00

The Screws of all the Clamps are made to reach the lower number.

WOOD HAND SCREWS.

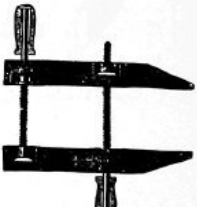
New Nos.	Diameter of Screws. Inches.	Whole Length of Screws. Inches.	Whole Length of Jaws. Inches.	Size of Jaws. Inches.	Opens. Inches.	Per Dozen.	Old Nos.
800	1¼	28	24	3 by 3	17	$12.00	0
801	1¼	26	22	2⅞ by 2⅞	15½	10.50	1
802	1¼	24	20	2⅞ by 2⅞	13¾	9.50	2
803	1¼	22	20	2½ by 2½	12	9.00	3
804	1⅛	22	18	2½ by 2½	12¼	8.50	4
805	1⅛	20	18	2¼ by 2¼	10½	8.00	5
806	1	20	16	2¼ by 2¼	11	7.50	6
807	1	18	16	2¼ by 2¼	9¼	7.00	7
808	⅞	18	14	2¼ by 2¼	10	6.50	8
809	⅞	16	14	2 by 2	8¼	6.00	9
810	⅞	16	12	1⅞ by 1⅞	8¼	6.50	10
811	¾	14	12	1⅞ by 1⅞	7¾	5.00	11
812	¾	12	10	1⅞ by 1⅞	5¼	4.25	12
813	⅝	10	8	1⅜ by 1⅜	4½	3.50	13
814	⅝	8	7	1⅜ by 1⅜	3	2.75	14
815	½	6	5	1 by 1	2	2.25	15
816	½	5	4	⅞ by ⅞	1¼	2.00	15½

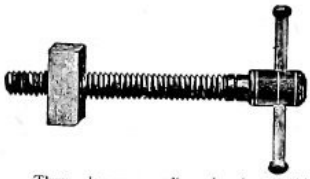
Either screw or jaw, one-third the price of the complete hand screw.

Either screw or jaw, one-quarter the price of the complete hand screw.

IMPROVED RENO HAND SCREW.

Length of Jaw.	Opening of Jaw.	Diameter of Screw	SIZE OF JAW.		Price per doz.
			Width.	Thickness.	
6 in.	5½ in.	⅞ in.	1¼ in.	1½ in.	$5 50
8	6½	1	1¼	1½	5 50
10	7½	1	1⅜	1⅛	5 50
12	8½	1	1⅜	1⅛	6 50
14	9½	1	1¾	2	7 50
16	10½	1	1⅞	2¼	9 00
18	11½	1	1⅞	2½	12 00
20	13½	1	2¼	2¼	14 00





HICKORY BENCH SCREWS.

No. 16.	2½	inch	Hickory	Screw	Per dozen, $8 00
" 17.	2¾	"	"	"	" 6 00
" 18.	2	"	"	"	" 5 00
" 19.	1¾	"	"	"	" 4 50
" 20.	1½	"	"	"	" 4 00
" 21.	1¼	"	"	"	" 3 00

These clamps are all made of malleable iron parts, wrought iron screws, and steel bars. The New Adjustable and Perfection Clamps are made in the following lengths and sizes:

2½, 3, 4 and 5-foot have....1¼x¼ inch bars.
5, 6, 7, 8, 9 and 10-foot have 1⅞x⅜ inch bars.

Joiners' Clamps—1, 1½ and 2-foot have hand-wheels for rapid work, 1¼x3-16 inch bars.

1	foot	Per pair,	$ 2 70
1½	"	"	2 85
2	"	"	3 00
2½	"	"	3 75
3	"	"	4 00
4	"	"	4 50
5	"	"	5 00
5	" heavy	"	7 50
6	" "	"	8 50
7	" "	"	9 50
8	" "	"	11 00
9	" "	"	12 50
10	" "	"	14 00

NEW ADJUSTABLE CLAMP.

PERFECTION CLAMP.

JOINERS' CLAMP.

ARMY AND NAVY GLUE

THE ONLY
ANIMAL GLUE
MADE IN
LIQUID FORM

MENDS ANYTHING
MENDABLE

STANDS MORE
HEAT AND COLD

DOES MORE WORK
DOES BETTER WORK

GLUES EVERYTHING
GLUABLE

THE 20TH CENTURY GLUE

NOT A FISH GLUE

		List.
Half gills, one dozen in box	per doz.,	$ 1 80
One " " " " "	"	2 40
Half pints, two " " case	"	3 25
One " one " " "	"	5 50
" quarts, " " " "	"	9 50
Half gallons, one dozen in case	"	15 00
One " one-half dozen in case	"	27 00
Five gallon cans	per gal.,	2 00
Ten " kegs	"	1 90

PLUG TOP CANS—EASY TO OPEN

You Can Use Every Drop

FLINT PAPER.

Sheets 9x11, half ream packages.

Nos.		
0000	per ream,	$ 5 50
000	"	5 50
00	"	5 50
0	"	5 50
½	"	5 50
1	"	6 00
1½	"	6 50
2	"	7 00
2½	"	7 50
3	"	8 50
3½	"	9 50
4	"	10 50
Assorted	"	6 50

EXTRA ROLL PAPER.

Per roll, 50 yards long.

Nos.	24 in.	30 in.	36 in.	40 in.	42 in.	48 in.
0000	$ 6 00	$ 8 00	$10 00	$12 00	$13 00	$15 00
000	6 00	8 00	10 00	12 00	13 00	15 00
00	6 00	8 00	10 00	12 00	13 00	15 00
0	6 00	8 00	10 00	12 00	13 00	15 00
½	6 00	8 00	10 00	12 00	13 00	15 00
1	6 50	8 50	10 50	12 50	13 50	16 50
1½	7 00	9 00	11 00	13 00	14 00	17 00
2	7 50	9 50	11 50	13 50	14 50	17 50
2½	8 00	10 00	12 00	14 00	15 00	18 00
3	9 00	11 00	13 00	15 00	16 00	20 00
3½	10 00	13 00	15 00	17 00	18 00	23 00
4	11 00	15 00	17 00	20 00	21 00	26 00

SAND PAPER.

Sheets 8¼x10½, half ream packages.

Nos.		
00	per ream,	$4 25
0	"	4 25
½	"	4 25
1	"	4 75
1½	"	4 75
2	"	4 75
2½	"	5 25
3	"	5 25
Assorted	"	4 75

POLISHING PAPER.

Ream packages.

Garnet	$3 50
Flint	3 00

DOUBLE FACED "PERFECTION POLISHING" PAPER.

Rolls 11 inches wide x 60 yards long, or sheets 9x11.

Garnet	$3 50
Flint	3 00

EMERY PAPER.

Sheets 9x11 inches. Half ream packages.

Nos.		
000	per ream,	$ 8 50
00	"	8 50
0	"	8 50
½	"	8 50
1	"	10 00
1½	"	10 50
2	"	11 00
2½	"	12 50
3	"	15 00
3½	"	17 50
Assorted	"	10 50

Nos. Rolls 24 inches wide, 50 yards long.

000	per roll,	$ 9 00
00	"	9 00
0	"	9 00
½	"	9 00
1	"	10 50
1½	"	11 00
2	"	11 50
2½	"	13 00
3	"	16 00
3½	"	18 00

GARNET PAPER.

Nos Sheets 9x11, half ream packages.

0000	per ream,	$ 6 00
000	"	6 00
00	"	6 00
0	"	6 00
½	"	6 00
1	"	6 50
1½	"	7 00
2	"	7 50
2½	"	8 00
3	"	9 00
3½	"	10 00
4	"	11 00
Assorted	"	7 00

EXTRA ROLL PAPER.

Per roll, 50 yards long.

Nos.	24 in.	30 in.	36 in.	40 in.	42 in.	48 in.
0000	$7 00	$9 00	$11 00	$13 00	$15 00	$18 00
000	7 00	9 00	11 00	13 00	15 00	18 00
00	7 00	9 00	11 00	13 00	15 00	18 00
0	7 00	9 00	11 00	13 00	15 00	18 00
½	7 00	9 00	11 00	13 00	15 00	18 00
1	7 25	9 50	11 50	13 50	15 50	19 50
1½	7 50	10 00	12 00	14 00	16 00	20 00
2	8 00	10 50	12 50	14 50	16 50	20 50
2½	8 50	11 00	13 00	15 00	17 00	22 00
3	9 50	12 00	14 00	16 00	18 00	25 00
3½	11 00	14 00	16 00	18 00	20 00	29 00
4	12 00	16 00	18 00	21 00	23 00	32 00

EMERY CLOTH.

Nos. Sheets 9x11 inches.	Quire packages.
FF	per ream, $24 00
F or 00	" 24 00
120 or 0	" 24 00
100	" 24 00
90 or ½	" 24 00
80 " 1	" 26 00
70 " 1½	" 27 00
60 " 2	" 28 00
54 " 2½	" 30 00
46 " 3	" 32 00
40 " 3½	" 34 00
Assorted	" 26 00
Crocus Cloth	" 24 00

Per roll, 50 yards long.

Nos.	9 in.	18 in.	27 in.
00	$ 8 50	$17 00	$25 50
0	8 50	17 00	25 50
½	8 50	17 00	25 50
1	9 50	19 00	28 50
1½	10 00	20 00	30 00
2	10 50	21 00	31 50
2½	11 00	22 00	33 00
3	12 00	24 00	36 00
3½	13 00	26 00	39 00

Number of Reams in Each Bundle of Flint Paper.

Nos.	0000	000	00	0	½	1
Reams	6	6	6	5½	5	4
Nos.	1½	2	2½	3	Assorted	
Reams	3½	3	2½	2	4	

FLINT CLOTH.

Per roll, 50 yards long.

Nos.	14 in.	28 in.
00	$11 00	$22 00
0	11 00	22 00
½	11 00	22 00
1	12 00	24 00
1½	12 50	25 00
2	13 00	26 00
2½	14 00	28 00
3	15 00	30 00

GARNET CLOTH.

Per roll, 50 yards long.

Nos.	14 in.	28 in.
00	$13 00	$26 00
0	13 00	26 00
½	13 00	26 00
1	14 00	28 00
1½	14 50	29 00
2	15 00	30 00
2½	15 50	31 00
3	16 00	32 00

Number of Reams in Each Bundle of Garnet Paper.

Nos.	0000	000	00	0	½
Reams	5	5	5	5	5
Nos.	1	1½	2	2½	3
Reams	4	3	2½	2	1½

EMERY.

		GRAIN Nos. 4 to 46 inclusive	GRAIN Nos. 54 to 180 inclusive	FLOUR C. F., F. and F. F.
In kegs of about 350 pounds	Per pound,	$0.05	$0.05½	$0.03½
¼ kegs of about 175 pounds	"	.05¼	05¾	.03¾
⅛ kegs of about 90 pounds	"	.05¾	06	.04
10 pound tin cans, 10 in case	"	.06½	.07	.06
Less quantity	"	.10	.10	.08

Crocus at same prices as fine grain.

CORUNDUM.

		Nos. 4 to 46 inclusive	Nos. 54 to 180 inclusive	Flour
In kegs of about 275 pounds	Per pound,	$0.15	$0.12	$0.06
½ kegs of about 135 pounds	"	.16	.14	.08
¼ kegs of about 50 pounds	"	.18	.16	.10
10-pound cans	"	.20	.18	12

EMERY GLUE.

Best Emery Glue, "Lion"	$0.22	Imported, "Square"	$0.18
Finest Emery Glue, XXXX	.25	Pure, powdered	.20

TRIPOLI COMPOSITION.

Tripoli Composition is especially adapted for cutting down and polishing brass, bronze, britannia, and other metals preparatory to plating.

Standard Tripoli Composition, O. S, for cutting and polishing		Per pound, $
" " "	M, very greasy	"
" " "	No. 6, hard and fast cutting	"
" " "	H, very fast cutting	"
" " "	No. 9, similar to O. S, slightly sharper	"

OIL STONES.

ARKANSAS.

The Arkansas Stone is, as far as is known, the hardest and finest whetstone in the world. It is composed of nearly pure silica in the form of minute crystals interpenetrating each other. It differs from "Washita" only in the minuteness of the crystals and more compact arrangement of the same, and is consequently very much harder. To engravers, watch-makers and all others using tools requiring a very fine edge, it is of the greatest value, and should be used carefully with pure sperm oil, or two-thirds sperm and one-third glycerine. Arkansas Oil Stones are regularly made in the following assortment:

									Hard.	Soft.
Assortment	"A,"	quality	No. 1,	length 3 to 5¼,	width 1½ to 2,	thickness ¾ to 1	Price,	per lb.,	$2 80	$1 50
"	"B,"	"	" 1,	" 5¼ to 8,	" 1½ to 2,	" ¾ to 1	"	"	3 50	1 70
"	"C,"	"	" 1,	" 8 to 12,	" 1½ to 2,	" ¾ to 1	"	"	4 00	1 90
"	"D,"	"	" 2,	" 3 to 5¼,	" 1½ to 2,	" ¾ to 1	"	"	1 00	50
"	"E,"	"	" 2,	" 5½ to 8,	" 1½ to 2,	" ¾ to 1	"	"	1 50	70

ARKANSAS, MOUNTED IN POLISHED MAHOGANY BOXES.

		Hard.	Soft.			Hard.	Soft.
8 x 2	Per dozen,	$40 00	$24 00	4 x 1½	Per dozen,	$14 00	$10 00
7 x 2	"	36 00	20 00	3½ x 1	"	9 00	7 00
6 x 2	"	30 00	18 00	4 x 1, on mahogany handles	"	7 00	5 00
5 x 2	"	24 00	15 00				

WASHITA.

Extra Lily White	Per pound,	$0 60	No. 1. Washita, Per pound, $0 40
Rosy Red	"	60	" 2. " " 30
Extra Washita, green paper wrapper	"	50	

WASHITA, MOUNTED IN POLISHED CHERRY BOXES.

Sizes	9 x 2	8 x 2	7 x 2	6 x 2	5 x 2	4 x 1½	3½ x 1
No. 1. Per dozen	$14 00	$12 00	$11 00	$10 00	$ 9 00	$7 00	$5 50
Lily White and Rosy Red. Per dozen	16 00	14 00	13 00	11 50	10 00	9 00	6 00

3½ x 1 inch vulcanized rubber boxes, Per dozen, $7 00

ROUND EDGE SLIPS.

ARKANSAS.

No. 1. Regular, 3 to 5 x 1½ to 2 x ½ to ⅝ in. back x ⅛ to ¾ edge. Per lb., hard, $4.00; soft, $2.50.

No. 1. Small, 3 to 5 x 1½ to 1¾ x ¼ to ⅜ in. back x ⅛ in. to

No. 2. Assorted sizes. Per lb., hard, $2.50; soft, $1.00. sharp edges. Per lb., hard, $6.00; soft, $4.00.

WASHITA

Lily White,	3 to 5 x 1½ to 2 x ⅜ to ⅝ back x ⅛ to 5-16 in. edge	Per pound,	$0 90
Rosy Red.	3 to 5 x 1½ to 2 x ⅜ to ⅝ back x ⅛ to 5-16 in. edge	"	90
Extra,	3 to 5 x 1½ to 2 x ⅜ to ⅝ back x ⅛ to 5-16 in. edge	"	80
No. 1,	3 to 5 x 1½ to 2 x ⅜ to ⅝ back x ⅛ to 5-16 in. edge	"	70
No. 2,	3 to 5 x 1½ to 2 x ⅜ to ⅝ back x ⅛ to 5-16 in. edge	"	40

ARKANSAS SQUARE FILES.

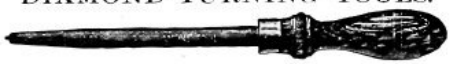
					Hard.	Soft.
Assorted,	3 to 4½ inch long x	⅛ to ⅜	inch square	Per dozen,	$3 50	$2 60
"	3 to 4½ inch long x	⅛ to 3-16	inch square	"	4 00	3 00
"	3 to 4½ inch long x	¼	inch square	"	4 00	3 00
"	3 to 4½ inch long x	5-16	inch square	"	4 00	3 00
"	3 to 4½ inch long x	⅜	inch square	"	4 50	3 40
"	3 to 4½ inch long x	½	inch square	Per pound,	6 00	4 50
"	4½ to 5½ inch long x	⅝	inch square	"	5 50	4 00
"	4½ to 5½ inch long x	¾	inch square	"	5 00	3 75
"	4½ to 5½ inch long x	1	inch square	"	4 50	3 40

RUB STONES, BRICKS, HONES, STICKS.

LIST OF STANDARD SIZES OF EMERY BRICKS.

8 x 4 x 3	$4.10	8 x 1½ x ¾	$0.62
8 x 4 x 2½	3.40	7 x ¾ x ¾	.44
8 x 4 x 2	2.70	7 x ½ x ½	.39
8 x 3 x 3	3.10	7 x ¼ x ¼	.37
8 x 3 x 2½	2.60	7 x ⅜ x ⅜	.35
8 x 3 x 2	2.00	6 x 1½ x 3	.75
8 x 2 x 2	1.40	4 x 4 x 3	2.05
8 x 2 x 1½	1.00	4 x 3 x 3	1.35
8 x 2 x 1¼	.84	4 x 3 x 2½	1.30
8 x 2 x 1	.76	4 x 3 x 2	1.00
8 x 1¼ x 1	.72	4 x 2 x 2	.70

DIAMOND TURNING TOOLS.



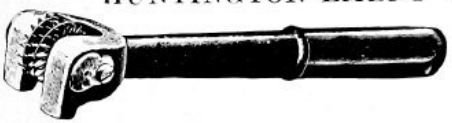
PRICES OF HAND DIAMOND TOOLS.

No. 1..... $5.00 | No. 2..... $8.00 | No. 3..... $10.00

Price of Lathe Diamond Tool, No. 4..... $12.00

Old Diamond Points reset and Sharpened at low prices.

HUNTINGTON EMERY WHEEL DRESSER.



For Truing, Shaping, Sharpening and Removing Glaze from solid Emery Wheels running at full speed.

Price of Dresser, with extra Cutter..... $2.50
" " Cutters..... Per dozen, 3.00

CHALLENGE DOUBLE EMERY WHEEL DRESSER.

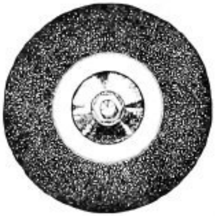
The only Double Dresser, and the only one that grooves, also dresses; therefore the only one guaranteed to increase the efficiency of emery wheels and grindstones fully 25 per cent. over any other dresser.

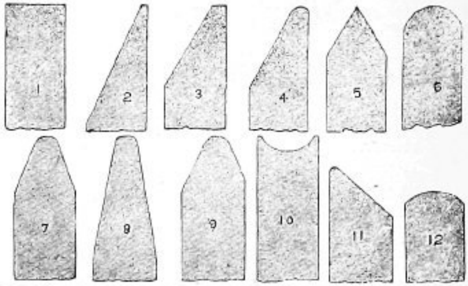
LIST PRICE.

Dresser	Each,	$2.50
Extra Grooving Cutters	"	.75
" Facing "	Set,	.50

Replace worn-out Cutters with new ones (by mail) and the Dresser will last indefinitely.

ZELNICKER EMERY WHEELS.

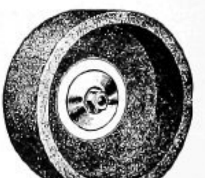




Diameter, Inches	THICKNESS OF WHEELS IN INCHES																	
	¼	⅜	½	⅝	¾	⅞	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4
1	$ .25	.30	.30	.35	.35	.40	.40	.45	.50	.55	60	65	70	75	80	85	.90	1.00
1½	.30	.35	40	.45	.45	.50	.50	55	.60	.65	70	75	80	85	90	95	1.00	1.10
2	.35	45	.50	55	.55	.60	60	.65	70	75	80	85	90	.95	1.00	1.05	1.10	1.20
2½	.40	.55	.65	.70	.75	.80	.85	.95	1.05	1.15	1.25	1.35	1.45	1.55	1.65	1.75	1.85	2.05
3	.50	.65	.80	.90	.95	1.05	1.10	1.25	1.40	1.55	1.70	1.85	2.00	2.15	2.30	2.45	2.60	2.90
3½	.60	.80	.95	1.05	1.15	1.25	1.35	1.55	1.75	1.95	2.15	2.35	2.55	2.75	2.95	3.15	3.35	3.75
4	.75	.95	1.10	1.25	1.35	1.50	1.60	1.85	2.10	2.35	2.60	2.85	3.10	3.35	3.60	3.85	4.10	4.60
4½	.90	1.10	1.25	1.40	1.55	1.70	1.85	2.15	2.45	2.75	3.05	3.35	3.65	3.95	4.25	4.55	4.85	5.45
5	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.60	3.00	3.40	3.80	4.20	4.60	5.00	5.40	5.80	6.20	7.00
6	1.40	1.60	1.75	2.10	2.40	2.75	3.05	3.70	4.35	5.00	5.65	6.30	6.95	7.60	8.25	8.90	9.55	10.85
7	1.85	2.00	2.15	2.60	3.00	3.45	3.85	4.70	5.55	6.40	7.25	8.10	8.95	9.80	10.65	11.50	12.35	14.05
8	2.10	2.35	2.60	3.10	3.60	4.10	4.60	5.60	6.60	7.60	8.60	9.60	10.60	11.60	12.60	13.60	14.60	16.60
9	2.50	2.80	3.10	3.70	4.25	4.85	5.40	6.55	7.70	8.85	10.00	11.15	12.30	13.45	14.60	15.75	16.90	19.20
10	3.00	3.35	3.65	4.35	5.00	5.70	6.35	7.70	9.05	10.40	11.75	13.10	14.45	15.80	17.15	18.50	19.85	22.55
12	3.60	3.80	4.00	5.00	6.00	6.70	7.40	9.00	10.70	12.75	14.00	15.70	17.40	19.00	20.75	22.50	24.25	27.50
14	4.05	5.15	6.25	7.35	8.45	9.55	10.65	12.85	15.05	17.25	19.45	21.65	23.85	26.05	28.25	30.45	32.65	37.05
16	....	....	....	....	10.85	12.30	13.70	16.55	19.40	22.25	25.00	27.95	30.80	33.65	36.50	39.35	42.20	47.00
18	....	....	....	....	13.25	15.15	17.00	20.75	24.50	28.25	32.00	35.75	39.50	43.25	47.00	50.75	54.50	62.00
20	....	....	....	....	.....	.....	20.25	24.75	29.25	33.75	38.25	42.75	47.25	51.75	56.25	60.75	65.25	74.25
22	....	....	....	....	.....	.....	25.00	31.00	37.00	43.00	49.00	55.00	61.00	67.00	73.00	79.00	85.00	97.00
24	....	....	....	....	.....	.....	29.00	36.00	43.00	50.00	57.00	64.00	71.00	78.00	85.00	92.00	99.00	113.00
26	....	....	....	....	.....	.....	.....	43.00	51.00	59.00	67.00	75.00	83.00	91.00	99.00	107.00	115.00	131.00
30	....	....	....	....	.....	.....	.....	.....	61.00	72.00	83.00	94.00	105.00	116.00	127.00	138.00	149.00	171.00
36	....	....	....	....	.....	.....	.....	.....	95.00	110.50	126.00	141.50	157.00	172.50	188.00	203.50	219.00	250.00

EMERY CYLINDERS AND CUP WHEELS.

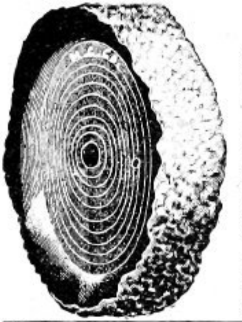
Diam., Inches	Height, Inches	THICKNESS OF RIM, INCHES						
		1	1½	2	2½	3	3½	4
8	5	$14.15	.....	.....	.....	.....	.....	.....
9	5	15.65	20.10	.....	.....	.....	.....	.....
10	5	17.30	22.90	26.75	.....	.....	.....	.....
12	5	19.75	26.45	32.20	34.95	37.10	.....	.....
14	5	26.80	32.05	39.25	42.50	45.40	50.05	50.90
16	5	33.65	38.45	45.90	50.80	54.80	60.60	62.75
18	5	40.00	51.00	56.20	60.65	64.75	72.40	76.55
20	5	46.60	59.95	65.20	70.40	75.55	83.25	86.70
22	5	54.25	70.70	78.45	85.25	90.40	101.60	106.35
24	5	63.80	82.40	88.65	96.80	103.10	116.30	121.25
26	5	71.40	95.75	104.00	110.10	116.30	132.55	139.00



Above list is figured on a basis of cylinders 5 inches long, other lengths at proportionate rates.

CUP WHEELS.

To obtain price of Cup Wheels add to the price of cylinder of same dimensions the price of a regular wheel whose diameter is the inside diameter of the cylinder, and the thickness, whatever is required



CLOTH WHEELS.

Made of disks of muslin cloth, stitched spirally and cemented to within one to three inches of periphery.

The surface of the wheel being extremely soft and yielding, permits the face of the wheel to assume any shape desired, and conforms to varying surfaces to be polished.

Extensively used by manufacturers of plows, shovels and farm implements for producing finishing polish.

Diam. in inches.	THICKNESS IN INCHES.						
	1	1½	2	2½	3	3½	4
8	$1.00	$1.50	$2.00	$2.40	$2.80	$3.20	$3.50
10	1.10	1.60	2.10	2.50	3.10	3.60	4.00
12	1.50	2.25	3.00	3.60	4.50	5.00	5.50
14	2.00	3.00	3.90	4.80	5.70	6.50	7.25
15	2.30	3.40	4.50	5.60	6.60	7.50	8.40
16	2.75	4.10	5.40	6.70	8.00	9.25	10.25
18	3.75	5.50	7.40	9.20	11.00	12.50	14.00
20	5.00	7.60	10.00	12.50	14.50	16.50	18.50

SECTION BUFFS.

Muslin, Cotton Flannel and Printers' Cloth, Bleached and Unbleached,

18 pieces or layers to a section. Prices on application.

PATENTED PAPER POLISHING WHEELS.

Made in Two Styles.

The Straw Board Paper Wheel—a hard wheel for rough work such as polishing plows, farming tools and all sheet metals.

The Felt Paper Wheel—a soft wheel with slightly yielding surface, adapted for finishing work, such as grates, mantels, stove trimmings and all flat metal surfaces.

The iron center bushing is securely held in place, and the wheels are easily kept in balance. They may be run at highest rate of speed with absolute safety.

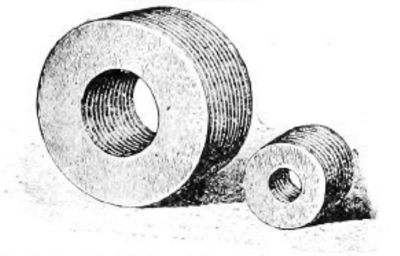
Diam. in inches.	THICKNESS IN INCHES.						
	1	1¼	1½	1¾	2	2¼	2½
4	$ .50	$ .60	$ .70	$ .80	$ .90	$1.00	$1.10
6	.75	.85	.95	1.05	1.15	1.25	1.35
8	1.00	1.15	1.30	1.45	1.60	1.80	2.00
10	1.25	1.50	1.75	2.00	2.25	2.50	2.75
12	1.50	1.80	2.20	2.40	2.70	3.00	3.25
14	1.75	2.05	2.35	2.65	2.95	3.25	3.50
16	2.00	2.35	2.70	3.05	3.40	3.70	4.00
18	2.50	2.90	3.30	3.75	4.20	4.60	5.00
20	3.00	3.50	4.00	4.50	5.00	5.50	6.00
22	3.50	4.05	4.60	5.20	5.80	6.40	7.00
24	4.00	5.00	6.00	7.00	8.00	8.50	9.00

Diam. in inches.	THICKNESS IN INCHES.					
	2¾	3	3¼	3½	3¾	4
4	$1.20	$1.30	$1.40	$1.50	$ 1.60	$ 1.75
6	1.45	1.55	1.65	1.75	1.90	2.00
8	2.15	2.30	2.45	2.60	2.80	3.00
10	3.00	3.20	3.40	3.60	3.80	4.00
12	3.50	3.75	4.00	4.25	4.50	4.75
14	3.80	4.10	4.40	4.70	5.00	5.25
16	4.35	4.70	5.00	5.35	5.70	6.00
18	5.40	5.85	6.25	6.65	7.00	7.50
20	6.50	7.00	7.50	8.00	8.50	9.00
22	7.60	8.20	8.75	9.35	9.95	10.50
24	9.50	10.00	10.50	11.00	11.50	12.00

Sizes under 1 in. thick, same price as 1 in.; under 4 in. diam., same price as 4 in. Intermediate sizes, same price as next size above.

PAPER FRICTION PULLEYS.

PAPER FILLERS.



Made from Special Trunk Board Stock, any size or shape, cemented and pressed. Of great efficiency and durability.

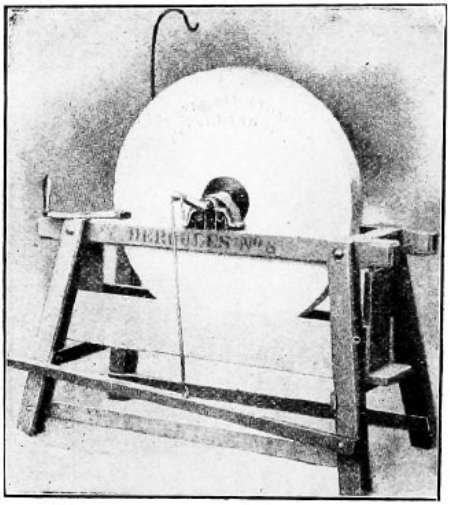
Diam.	Face.	Pressed Friction Roll or Filler.	Frict'n Wheel Complete with Flanges.
6	6	$ 2.14	$ 4.30
	8	2.80	5.32
7	4	1.80	4.00
	5	2.22	4.62
	6	2.64	5.28
	8	3.48	6.58
8	4	2.14	4.58
	5	2.64	5.28
	6	3.16	6.04
	8	4.18	7.52
9	4	2.70	5.40
	5	3.30	6.22
	6	3.90	7.06
	8	5.10	8.70
	9	5.70	9.54
10	4	3.46	6.62
	6	4.90	8.00
	8	6.34	10.58
	9	7.06	11.66
	10	7.78	12.64
	12	9.22	14.62
11	4	3.96	7.44
	6	5.64	9.66
	8	7.32	11.88
	9	8.16	13.08
	10	9.00	14.20
	12	10.68	16.42
12	4	4.46	8.28
	6	6.38	10.72
	8	8.30	13.20
	9	9.26	14.52
	10	10.22	15.74
	12	12.14	18.20

Diam.	Face.	Pressed Friction Roll or Filler.	Frict'n Wheel Complete with Flanges.
13	4	$ 5.10	$ 9.48
	6	7.32	12.34
	8	9.54	15.18
	9	10.64	16.68
	10	11.76	18.12
	12	13.98	20.98
14	4	5.84	10.62
	6	8.42	13.82
	8	11.00	17.04
	9	12.30	18.72
	10	13.58	20.34
	12	16.16	23.54
15	4	6.48	11.68
	6	9.36	15.18
	8	12.24	18.70
	9	13.68	20.52
	10	15.12	22.30
	12	18.00	25.80
16	4	7.22	13.12
	6	10.46	17.06
	8	13.70	21.02
	9	15.32	23.12
	10	16.94	25.10
	12	20.18	29.06
17	4	7.98	14.38
	6	11.58	18.70
	8	15.18	23.02
	9	16.98	25.30
	10	18.78	27.46
	12	22.38	31.78
18	4	8.72	15.62
	6	12.68	20.30
	8	16.64	24.98
	9	18.62	27.44
	10	20.60	29.78
	12	24.56	34.46

For Friction Rolls, Fillers or Wheels less than 6 inch diameter, use 6 inch list.

GRINDSTONES, HERCULES.

FOR FOOT POWER.



Frame of seasoned oak, with oil and varnish finish, strongly braced in all directions.

Furnished with crank, treadle, water trough and clothes protector.

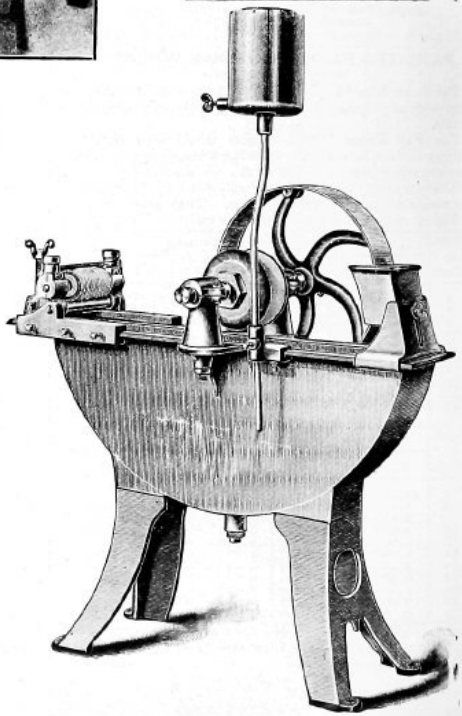
Size.	Diameter.	Thickness.	Stone Weighs About.	Price Complete, Each.
No. 1	24	2	80 lbs.	$6.50
" 2	24	3	120 "	7.50
" 3	26	2½	115 "	7.50
" 4	26	3	110 "	7.75
" 5	28	3	165 "	8.25
" 6	30	2	125 "	8.00
" 7	30	3	185 "	9.00
" 8	32	2½	180 "	8.75
" 9	34	2	160 "	8.75
" 10	34	3	240 "	10.50

IRON GRINDSTONE FRAME.

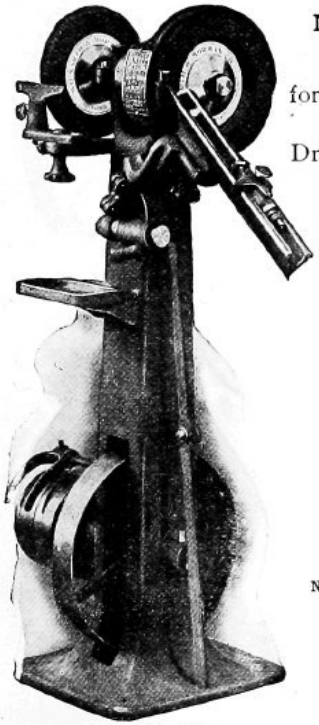
With adjustable tool rest, truing attachment and water pot.

Takes stone 30 inches in diameter and 4 inch face.

Price, complete.....$18 00
" without water pot 17 00



NEW YANKEE DRILL GRINDERS.



Style "J. A."

NEW AND ORIGINAL.

The simplest and best machine ever devised for grinding Twist Drills.

Requires no adjustments for centering the Drills before grinding.

Any clearance desired can be obtained.

Gives a more practical and scientific cutting point to the Drill than by any other method of grinding.

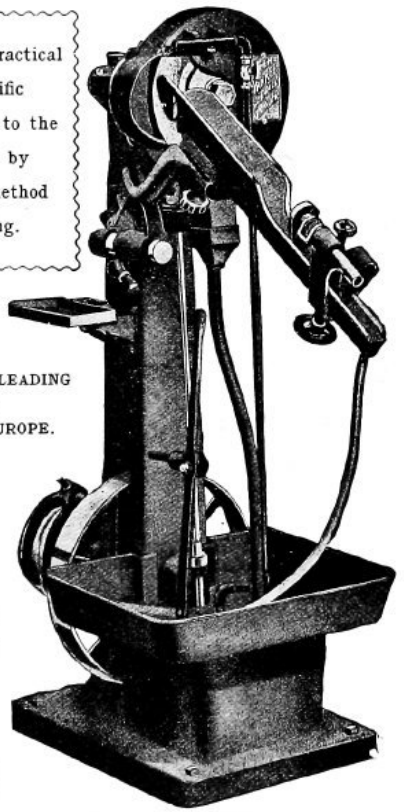
NOW USED IN ALL LEADING SHOPS OF AMERICA AND EUROPE.

Style "J. A."

Capacity, 3/32 to 1¼ inch Drills.

List Price.....$80 00

Thirty different styles made, suiting the conditions existing in any shop.



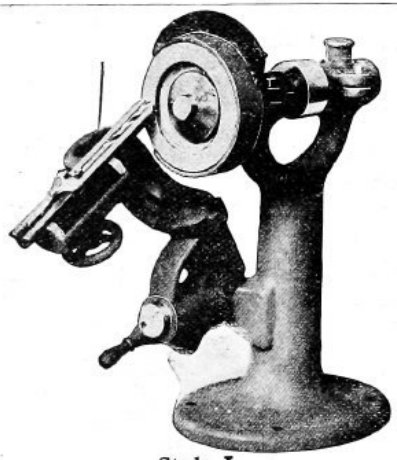
Style "P."

Style "P."

Capacity, ⅛ to 2¼ inch Drills.

A perfect machine for Wet Drill Grinding. Centrifugal pump; no bearings under water; no stuffing box; has steel spindles, ground journals. This machine can be used wet or dry. The tank has a settling basin into which the grit settles, and is not again drawn into the pump.

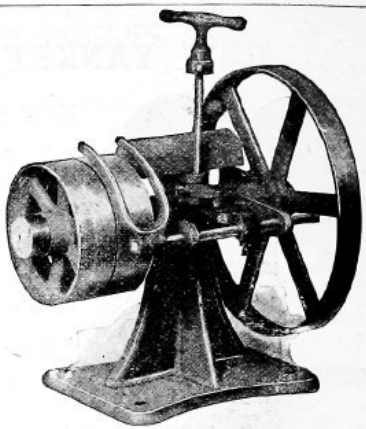
List Price.....$110 00



Style L.

BENCH GRINDER.

Capacity, 1/25 inch to 5/8 inch drills.
Size, 17 inches high.
Space occupied, 12x18 inches.
Weight, 88 lbs.; crated, 100 lbs.
Weight, boxed for export, 120 lbs.
Run Countershaft 600 revolutions.
Furnished with or without Countershaft.
Price .....$

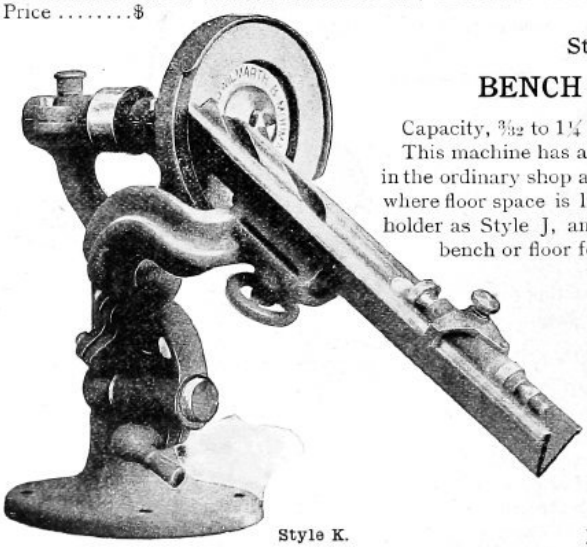


COUNTERSHAFT.

For Styles "L" and "K."

The simplicity of the Shifter in this Countershaft will be much appreciated. The oiling of the loose pulley is done at the end of the shaft. No oil is wasted and little possibility of its running dry.

Tight and Loose Pulleys, 6x1¼ inches.
Driving Pulley, 12x1¼ inches.
Price.....$



Style K.

BENCH GRINDER.

Capacity, 3/32 to 1¼ inch Drills.

This machine has a capacity for grinding all drills in the ordinary shop and can be used to advantage where floor space is limited. It has the same drill holder as Style J, and can be furnished in either bench or floor form.

Size, 18 inches high.
Space occupied, 12x20 inches.
Weight, 95 lbs.; crated, 115 lbs.
Weight, boxed for export, 125 lbs.
Run Countershaft 550 revolutions.

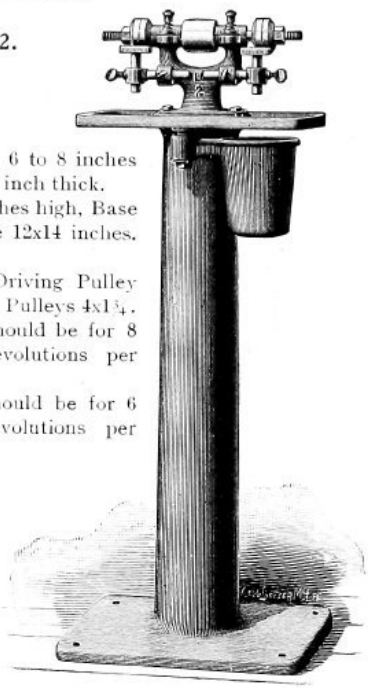
Price.....$

Style K.

VULCAN GRINDERS.

Nos. 1 and 2.

No. 1.



No. 2.

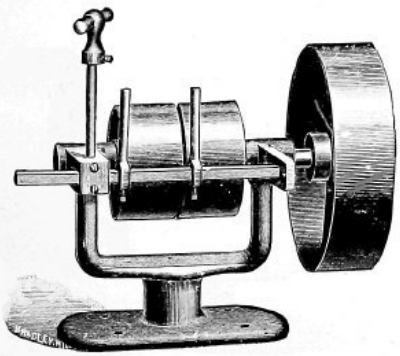
For Wheels from 6 to 8 inches in diameter, and ¾ inch thick.

Column is 32 inches high, Base 14x16 inches, Table 12x14 inches. Weight 120 lbs.

Countershaft has Driving Pulley 10x2, Tight and Loose Pulleys 4x1¾.

Speed of Counter should be for 8 inch Wheels 520 revolutions per minute.

Speed of Counter should be for 6 inch Wheels 700 revolutions per minute.

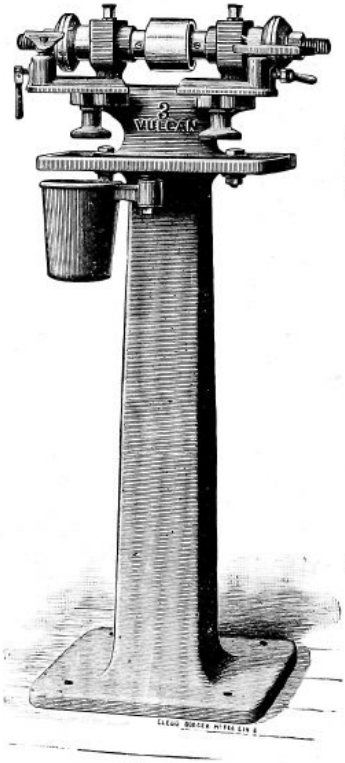


Countershaft for Nos. 1 and 2 Grinders.

	No. 1.	No. 2.
Bearings	2x¾	2x¾
Length of Arbor	12	12
Pulley	2x2	2x2
Table to Arbor	5	5
Diameter between Collars	⅝	⅝
" of Collars	2	2
Weight without Countershaft	135	140
Price complete	$23 00	$25 50
" of Head	5 50	8 00
" " Column	9 50	9 50
" " Countershaft	8 00	8 00

VULCAN GRINDER.

No. 3.



No. 3.

To carry two 10x1½ emery wheels.

Has adjustable boxes, heavy adjustable rests, nickel plated self-oilers and dust-protectors which keep the oil off the emery wheels and absolutely protect the journals from emery dust.

Length of Steel Spindle, 18½ inches.
Distance between Wheels, 11¾ inches.
Size of Spindle between Collars, ⅞ inch.
Size of Bearings, 3½x1 5/16 inches.
Size of Pulleys on Arbor, 3x2¾ inches.
Size of Base of Head, 10x7 inches.
Height from Base to Spindle, 7 inches.
Weight without Countershaft, 165 lbs.

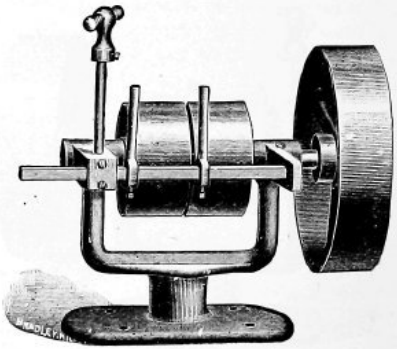
Price complete	$36 50
" of Head	12 50
" " Column	12 00
" " Countershaft	12 00

Column is 32 inches high, Base 14x16, Table 12x14.

Countershaft has Driving Pulley 12x3¾, Tight and Loose Pulleys 6x3¼.

Improved Belt Shifter.

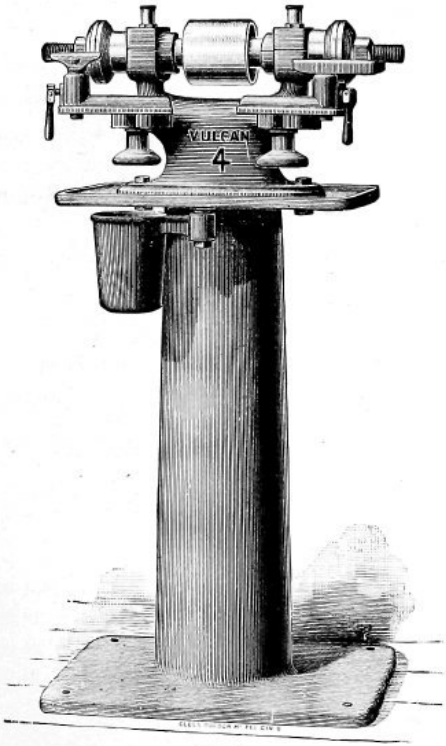
Speed of Countershaft should be 525 revolutions per minute.



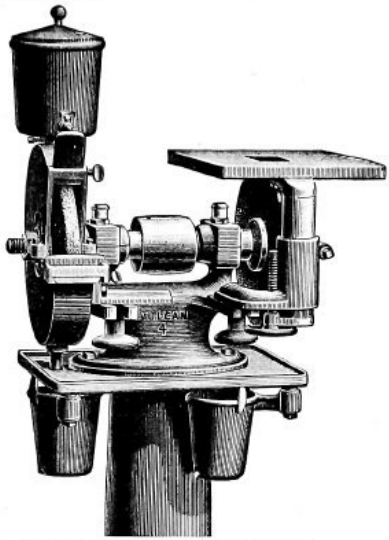
Countershaft for No. 3.

VULCAN GRINDERS.

No. 4.



No. 4.



No. 4 Vulcan Grinder with Surface and Water Attachments.

Price complete	$43 00
" of Head	18 00
" " Column	13 00
" " Countershaft	12 00
" " Surface Attachment, extra,	15 50
" " Water " "	15 50

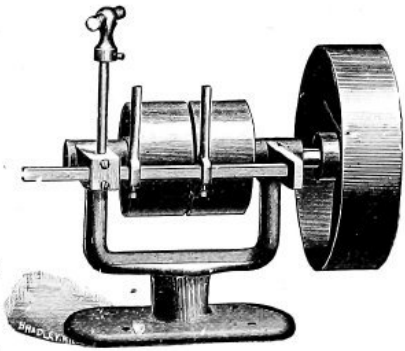
Journals are dust-proof at both ends.
To carry two 12x2 inch Wheels.

Length of Steel Arbor, 22 inches.
Distance between Wheels, 14¼ inches.
Size of Spindle between Collars, 1 inch.
Size of Bearings, 4x1 1/16 inches.
Pulley on Arbor, 4x3¾ inches.
Size of Base of Head, 8½x12 inches.
Weight without Countershaft, 230 lbs.

Column is 30 inches high, Base 16x20, Table 14x18.

Countershaft has Tight and Loose Pulleys 6x3¼, Driving Pulley 12x3¼.

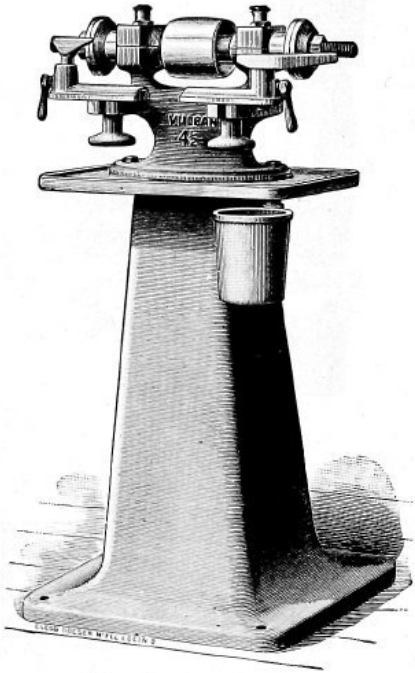
Speed of Countershaft should be 600 revolutions per minute.



Countershaft for No. 4 Grinder.

VULCAN GRINDER.

No. 4½.



No. 4½ Vulcan Grinder.

To carry two Wheels 12x2.

This is the same Grinder Head as our No. 4, mounted on heavier column.

Journals are self-oiling and dust-proof at both ends.

Wrenches are permanently attached.

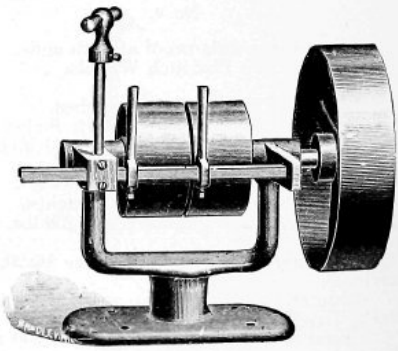
Length of Steel Arbor, 22 inches.
Distance between Wheels, 14¼ inches.
Size of Spindle between Collars, 1 inch.
Size of Bearings, 4x1 1/16 inches.
Pulley on Arbor, 4x3¾ inches.
Size of Base, 8½x12 inches.
Weight on Column, 330 lbs.

Price complete	$54 00
" of Head	18 00
" " Column	24 00
" " Countershaft	12 00

Column is 30 inches high, Base on floor 20x24, Table 14x18.

Countershaft has Driving Pulleys 12x3¼, and Tight and Loose Pulleys 6x3¼.

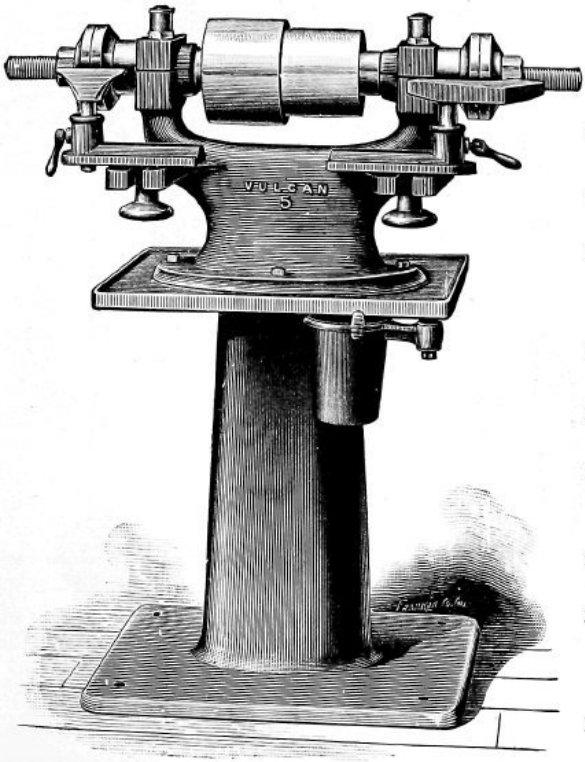
Speed should be 600 revolutions per minute.



Countershaft for No. 4½ Grinder.

VULCAN GRINDER.

No. 5.



No. 5 Vulcan Grinder.

To carry two Wheels 16x3 or 18x2.

All Wrenches permanently attached.

It has nickel plated self-oilers.

Journals dust-proof at both ends.

Length of Steel Arbor, 33½ inches.

Distance between Wheels, 22 inches.

Size between Collars, 1¼ inches.

Bearings, 5x1 5/16 inches.

Pulley on Arbor, 6 and 5x4½ inches.

Distance from Arbor to floor, 36 inches.

Weight on Column. 360 lbs.

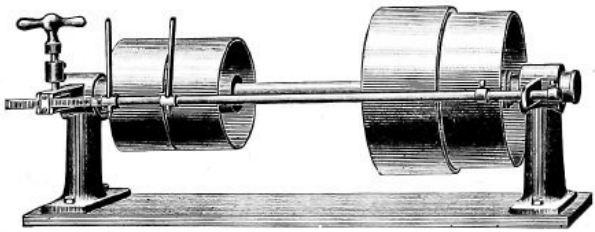
Price complete.....$73 00
" of Head..... 34 00
" " Column..... 22 00
" " Countershaft... 17 00

Countershaft has Tight and Loose Pulleys 8x4½, Cone Pulleys 11 and 12x4½.

Speed of Counter for 16 inch Wheels should be 540 revolutions per minute.

Speed of Counter for 18 inch Wheels should be 480 revolutions per minute.

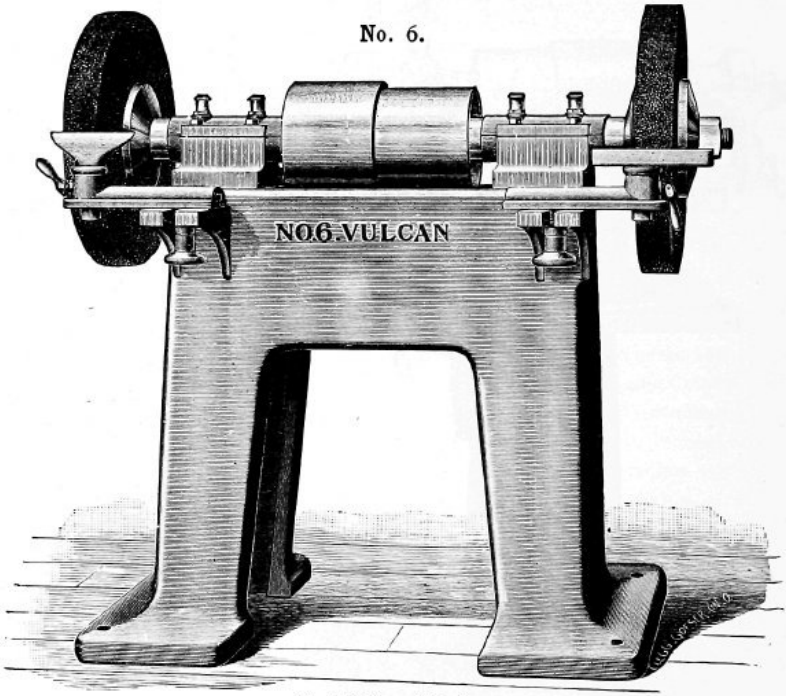
Column 24 inches high, Base 18x22, Table 16x20 inches.



Countershaft for No. 5 Grinder.

VULCAN GRINDER.

No. 6.



No. 6 Vulcan Grinder.

To carry two 20x4 inch Wheels or two 24x2 inch Wheels. Larger Wheels also can be run.

The Journals are dust-proof and ring-oiling. Caps are provided with tongue and groove and can be taken up readily.

The Rests are very rigid and easily adjusted.

Length of Steel Arbor, 49 inches.
Diameter between Collars, 1½ inches.
Distance between Wheels, 3 feet.
Size of Bearings, 9x1 9/16 inches.

Size of Cone Pulley on Arbor, 7 and 8x6½ inches.
Arbor to Floor, 34 inches.
Diameter of Collars, 8 inches.
Weight, 1,100 lbs.

Countershaft has Tight and Loose Pulleys, 7x6½ inches.

When 20 inch Wheels are used, Counter should run 460, and for 24 inch Wheels 400 revolutions per minute.

Price..... $130 00

SPRING COTTERS.

PRICE PER THOUSAND.

Wire Gauge	13	12	11	10	9	8	7	6
Diameter	3/32	7/64	1/8	9/64	5/32	11/64	3/16	13/64
Length 1/2	$3.50	4.00	5.00	6.00	7.00	8.00	.....	.....
" 3/4	4.15	4.75	5.85	7.00	8.15	9.30	10.60	12.00
" 1	4.80	5.50	6.70	8.00	9.30	10.60	12.20	14.00
" 1 1/4	5.45	6.25	7.55	9.00	10.45	11.90	13.80	16.00
" 1 1/2	6.10	7.00	8.40	10.00	11.60	13.20	15.40	18.00
" 1 3/4	6.75	7.75	9.25	11.00	12.75	14.50	17.00	20.00
" 2	7.40	8.50	10.10	12.00	13.90	15.80	18.60	22.00
" 2 1/4	.....	.....	10.95	13.00	15.05	17.10	20.20	24.00
" 2 1/2	.....	.....	11.80	14.00	16.20	18.40	21.80	26.00
" 2 3/4	.....	.....	.....	.....	.....	.....	23.40	28.00
" 3	.....	.....	.....	.....	.....	.....	25.00	30.00

Wire Gauge	5	4	1				
Diameter	7/32	1/4	9/16	3/8	7/16	1/2	5/8
Length 1	$16.00	20.00	29.00	.....	.....	.....	.....
" 1 1/4	18.50	23.50	33.50	.....	.....	.....	.....
" 1 1/2	21.00	27.00	38.00	60.00	.....	.....	.....
" 1 3/4	23.50	30.50	42.50	66.00	80.00	.....	.....
" 2	26.00	34.00	47.00	72.00	88.50	110.00	.....
" 2 1/4	28.50	37.50	51.50	78.00	97.00	121.00	.....
" 2 1/2	31.00	41.00	56.00	84.00	105.50	132.00	.....
" 2 3/4	33.50	44.50	60.50	90.00	114.00	143.00	.....
" 3	36.00	48.00	65.00	96.00	122.50	154.00	320.00
" 3 1/4	.....	51.50	69.50	102.00	131.00	165.00	336.00
" 3 1/2	.....	55.00	74.00	108.00	139.50	176.00	352.00
" 3 3/4	.....	58.50	78.50	114.00	148.00	187.00	368.00
" 4	.....	62.00	83.00	120.00	156.50	198.00	384.00
" 5	.....	.....	.....	.....	190.50	242.00	448.00
" 6	.....	.....	.....	.....	.....	286.00	512.00

FLAT SPRING KEYS.

Width	3/8	1/2	5/8	3/4
Length 1 1/4	$30.00	40.00	.....	.....
" 1 1/2	34.00	44.50	.....	.....
" 1 3/4	38.00	49.00	60.00	.....
" 2	42.00	53.50	65.00	80.00
" 2 1/4	46.00	58.00	70.00	85.50
" 2 1/2	50.00	62.50	75.00	91.00
" 2 3/4	54.00	67.00	80.00	96.50
" 3	58.00	71.50	85.00	102.00
" 3 1/4	.....	.....	90.00	107.50
" 3 1/2	.....	.....	95.00	113.00

IRON WOOD SCREWS.

List of July 22, 1903. Price Per Gross.

In.	No.	$
1/4	0	.72
	1	.72
	2	.72
	3	.72
	4	.72
5/16	0	.72
	1	.72
	2	.72
	3	.72
	4	.72
	5	.75
	6	.78
	7	.82
	8	.88
	9	.94
3/8	1	.72
	2	.72
	3	.72
	4	.75
	5	.78
	6	.80
	7	.84
	8	.90
	9	.96
	10	1.05
	11	1.10
	12	1.20
7/16	1	.72
	2	.72
	3	.72
	4	.75
	5	.78
	6	.82
	7	.86
	8	.92
	9	.98
	10	1.07
	11	1.12
	12	1.20
	13	1.25
	14	1.30
1/2	2	.72
	3	.75
	4	.78
	5	.82
	6	.85
	7	.90
	8	.95
	9	1.00
	10	1.10
	11	1.15
	12	1.25
	13	1.35
	14	1.50
	15	1.65
	16	1.80

In.	No.	$
5/8	2	.74
	3	.78
	4	.82
	5	.85
	6	.90
	7	.94
	8	1.00
	9	1.05
	10	1.15
	11	1.25
	12	1.35
	13	1.45
	14	1.55
	15	1.75
	16	2.00
1	3	.80
	4	.84
	5	.87
	6	.92
	7	.98
	8	1.05
	9	1.10
	10	1.20
	11	1.30
	12	1.40
	13	1.60
	14	1.70
	15	2.00
	16	2.50
	17	2.70
	18	2.80
	20	3.50
1 1/4	3	.88
	4	.92
	5	.98
	6	1.05
	7	1.10
	8	1.15
	9	1.20
	10	1.30
	11	1.40
	12	1.55
	13	1.70
	14	1.99
	15	2.15
	16	2.50
	17	2.75
	18	3.30
	20	4.00
	22	4.80
	24	5.40

In.	No.	$
1 1/2	3	.98
	4	1.05
	5	1.10
	6	1.15
	7	1.20
	8	1.30
	9	1.35
	10	1.40
	11	1.50
	12	1.65
	13	1.80
	14	2.00
	15	2.35
	16	2.80
	17	3.20
	18	3.80
	20	4.30
	22	5.10
	24	5.90
1 3/4	5	1.30
	6	1.35
	7	1.45
	8	1.50
	9	1.55
	10	1.60
	11	1.70
	12	1.80
	13	2.00
	14	2.25
	15	2.60
	16	2.90
	17	3.50
	18	4.00
	20	4.50
	22	5.20
	24	6.00
2	5	1.45
	6	1.50
	7	1.55
	8	1.60
	9	1.65
	10	1.75
	11	1.85
	12	2.00
	13	2.20
	14	2.45
	15	2.75
	16	3.10
	17	3.70
	18	4.20
	20	4.80
	22	5.50
	24	6.40

In.	No.	$
2 1/4	5	1.55
	6	1.60
	7	1.65
	8	1.75
	9	1.85
	10	1.95
	11	2.05
	12	2.20
	13	2.35
	14	2.65
	15	3.10
	16	3.50
	17	3.85
	18	4.55
	20	5.30
	22	6.10
	24	6.90
2 1/2	5	1.90
	6	2.00
	7	2.10
	8	2.20
	9	2.30
	10	2.40
	11	2.50
	12	2.60
	13	2.70
	14	2.90
	15	3.30
	16	3.65
	17	4.20
	18	4.70
	20	5.80
	22	6.70
	24	7.50
2 3/4	6	2.40
	7	2.60
	8	2.70
	9	2.80
	10	2.90
	11	3.00
	12	3.10
	13	3.20
	14	3.30
	15	3.60
	16	3.90
	17	4.50
	18	5.00
	20	6.10
	22	7.20
	24	8.50

In.	No.	$
3	6	2.95
	7	3.00
	8	3.05
	9	3.10
	10	3.15
	11	3.20
	12	3.30
	13	3.40
	14	3.50
	15	3.80
	16	4.20
	17	4.80
	18	5.50
	20	6.50
	22	7.50
	24	8.70
	26	10.50
3 1/2	8	3.90
	9	4.00
	10	4.10
	11	4.20
	12	4.30
	13	4.40
	14	4.50
	15	4.75
	16	4.95
	17	5.40
	18	6.15
	20	7.30
	22	8.70
	24	10.20
	26	12.00
4	8	4.90
	9	5.10
	10	5.20
	11	5.30
	12	5.40
	13	5.60
	14	5.90
	15	6.20
	16	6.50
	17	7.00
	18	7.60
	20	8.60
	22	9.70
	24	11.20
	26	14.00
	28	16.00
	30	18.50

In.	No.	$
4 1/2	12	7.00
	13	7.20
	14	7.60
	15	7.85
	16	8.15
	17	8.60
	18	9.15
	20	9.85
	22	11.20
	24	13.50
	26	16.00
	28	18.50
	30	21.50
5	12	8.10
	13	8.30
	14	8.60
	15	9.10
	16	9.70
	17	10.10
	18	11.00
	20	11.50
	22	13.00
	24	15.00
	26	18.00
	28	21.00
	30	24.00
6	12	10.00
	13	10.30
	14	11.00
	15	11.60
	16	12.40
	17	13.00
	18	14.50
	20	16.00
	22	18.00
	24	20.00
	26	23.00
	28	27.00
	30	30.50

The following varieties of Iron Screws are invoiced from this list at varying discounts: Flat, Round, Fillister and Oval Head Screws, Dowel, Winged, Headless, Pinched, Bung Head and Felloe Screws, Bright, Blued, Nickel Plated, Silver Plated, Brassed, Bronzed, Coppered, Japanned, Lacquered and Tinned also Drive Screws.

BRASS WOOD SCREWS.

List of July 22, 1903. Price Per Gross.

In.	No.	$
1/4	0	.84
	1	.84
	2	.88
	3	.92
	4	.97
	5	1.04
3/8	0	.84
	1	.87
	2	.92
	3	.97
	4	1.04
	5	1.12
	6	1.20
	7	1.35
	8	1.50
1/2	1	.92
	2	.96
	3	1.02
	4	1.08
	5	1.20
	6	1.30
	7	1.45
	8	1.65
	9	1.90
	10	2.15
5/8	1	.96
	2	1.00
	3	1.08
	4	1.15
	5	1.30
	6	1.40
	7	1.60
	8	1.85
	9	2.10
	10	2.40
	11	2.65
	12	3.00
	13	3.35
	14	3.70
	15	4.10
	16	4.55
3/4	2	1.12
	3	1.18
	4	1.25
	5	1.40
	6	1.55
	7	1.75
	8	2.00
	9	2.30
	10	2.65
	11	3.00
	12	3.35
	13	3.70
	14	4.10
	15	4.55
	16	5.05
7/8	2	1.40
	3	1.50
	4	1.55
	5	1.60
	6	1.65
	7	1.90
	8	2.20
	9	2.50
	10	2.90
	11	3.35
	12	3.70
	13	4.10
	14	4.55
	15	5.05
	16	5.60
1	3	1.65
	4	1.70
	5	1.75
	6	1.80
	7	2.10
	8	2.45
	9	2.80
	10	3.15
	11	3.65
	12	4.10
	13	4.55
	14	5.05
	15	5.60
	16	6.65
	18	7.40
1 1/4	3	2.10
	4	2.20
	5	2.25
	6	2.35
	7	2.45
	8	2.85
	9	3.20
	10	3.50
	11	4.10
	12	4.65
	13	5.35
	14	5.85
	15	6.55
	16	7.20
	17	7.85
	18	9.35
	20	10.45
1 1/2	4	2.95
	5	3.05
	6	3.10
	7	3.20
	8	3.30
	9	3.65
	10	4.25
	11	4.65
	12	5.35
	13	5.95
	14	6.65
	15	7.60
	16	8.35
	17	9.15
	18	10.85
	20	12.65
	22	14.50
1 3/4	6	3.95
	7	4.00
	8	4.10
	9	4.20
	10	4.70
	11	5.35
	12	6.05
	13	6.70
	14	7.35
	15	8.65
	16	9.50
	17	10.45
	18	12.40
	20	14.50
	22	16.85
	24	18.90
2	6	5.15
	7	5.20
	8	5.25
	9	5.30
	10	5.40
	11	6.15
	12	6.85
	13	7.55
	14	8.45
	15	9.75
	16	10.70
	17	11.70
	18	13.90
	20	16.30
	22	18.90
	24	21.00
2 1/4	8	6.85
	9	6.95
	10	7.05
	11	7.25
	12	7.90
	13	8.80
	14	9.80
	15	10.75
	16	11.90
	17	13.00
	18	15.40
	20	18.00
	22	20.95
	24	23.30
2 1/2	9	9.40
	10	9.50
	11	9.60
	12	9.70
	13	9.85
	14	10.75
	15	11.85
	16	13.00
	17	14.30
	18	16.95
	20	19.85
	22	23.00
	24	25.50
2 3/4	9	11.50
	10	11.65
	11	11.80
	12	11.95
	13	12.10
	14	12.25
	15	13.00
	16	14.20
	17	15.65
	18	18.40
	20	21.60
	22	25.00
	24	28.00
3	10	13.70
	11	13.85
	12	14.00
	13	14.10
	14	14.30
	15	14.60
	16	15.40
	17	16.80
	18	19.95
	20	23.40
	22	27.10
	24	31.15
	26	35.85
	28	41.15
	30	47.45
3 1/2	10	15.85
	11	16.00
	12	16.15
	13	16.30
	14	16.45
	15	16.60
	16	17.70
	17	19.40
	18	22.75
	20	26.90
	22	31.20
	24	35.80
	26	41.20
	28	47.45
	30	54.55
4	12	18.60
	13	18.80
	14	19.00
	15	19.25
	16	20.35
	17	22.30
	18	26.90
	20	30.80
	22	36.00
	24	40.70
	26	47.35
	28	51.55
	30	62.70
4 1/2	14	22.60
	15	22.80
	16	23.40
	17	25.75
	18	30.90
	20	35.40
	22	41.40
	24	46.80
	26	54.40
	28	62.70
	30	72.15
5	16	26.90
	17	29.60
	18	35.50
	20	40.70
	22	47.60
	24	53.80
	26	62.60
	28	72.15
	30	82.95
6	16	31.00
	17	34.05
	18	40.80
	20	46.80
	22	54.75
	24	61.90
	26	72.95
	28	82.95
	30	93.35

The following varieties of Screws are invoiced from this list at varying discounts: Flat, Round, Fillister and Oval Head Screws, of Brass, Bronze or Phosphor Bronze, Bronzed or Lacquered, Nickel and Silver Plated on Brass.

ROUND HEAD.

IRON MACHINE SCREWS

PER GROSS.

FLAT HEAD.

	Our Standard Threads per Inch																		
	48 56 64	48 56	32, 36, 40		30 32 36	30 32	30 32 36	24, 30, 32		20 24	18 20 24	16, 18, 20		16, 18		14 16 18	14, 16		
	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30
Inch																			
3/16	$ .25	.25	.25	.29	.29	.35	.35	.43	.43	....	....	....	....	....	....	....	....	....	....
1/4	.25	.25	.25	.29	.29	.35	.35	.43	.43	.55	.68	....	....	....	....	....	....	....	....
5/16	.27	.27	.27	.31	.31	.38	.38	.46	.46	.59	.74	.95	....	....	....	....	....	....	....
3/8	.27	.27	.27	.31	.31	.38	.38	.46	.46	.59	.74	.95	1.05	1.20	1.40	1.65	....	....	....
7/16	.29	.29	.29	.33	.33	.41	.41	.49	.49	.59	.74	.95	1.10	1.25	1.45	1.70	....	....	....
1/2	.29	.29	.29	.33	.33	.41	.41	.49	.49	.59	.74	.95	1.10	1.25	1.45	1.70	....	....	....
9/16	.33	.33	.33	.36	.36	.46	.46	.54	.54	.66	.81	1.00	1.15	1.35	1.65	1.90	....	....	....
5/8	.33	.33	.34	.36	.36	.46	.46	.54	.54	.66	.81	1.00	1.15	1.35	1.65	1.90	2.35	....	....
3/4	.37	.37	.37	.42	.42	.52	.52	.63	.63	.74	.88	1.10	1.30	1.55	1.75	2.00	2.45	3.20	4.00
7/8	....	.48	.48	.48	.48	.60	.60	.72	.72	.85	1.00	1.20	1.40	1.65	1.90	2.20	2.70	3.30	4.25
1	....	....	.55	.55	.55	.70	.70	.85	.85	.97	1.15	1.35	1.55	1.80	2.10	2.55	3.10	3.75	4.50
1 1/8	....	....	.75	.75	.75	.85	.85	1.05	1.05	1.25	1.45	1.65	1.85	2.10	2.50	3.00	3.60	4.35	5.25
1 1/4	....	....	.75	.75	.75	.85	.85	1.05	1.05	1.25	1.45	1.65	1.85	2.10	2.50	3.00	3.60	4.35	5.25
1 3/8	....	....	1.00	1.00	1.00	1.15	1.15	1.35	1.35	1.60	1.80	2.00	2.20	2.50	3.00	3.60	4.30	5.10	6.00
1 1/2	....	....	1.00	1.00	1.00	1.15	1.15	1.35	1.35	1.60	1.80	2.00	2.20	2.50	3.00	3.60	4.30	5.10	6.00
1 3/4	....	....	....	....	1.25	1.35	1.35	1.70	1.70	1.80	2.05	2.40	2.55	2.90	3.45	4.10	4.85	5.70	6.65
2	....	....	....	....	1.50	1.65	1.65	2.00	2.00	2.10	2.30	2.75	2.90	3.35	3.95	4.65	5.45	6.35	7.35
2 1/4	....	....	....	....	....	....	2.00	2.30	2.30	2.50	2.75	3.10	3.25	3.70	4.35	5.00	5.85	6.90	8.00
2 1/2	....	....	....	....	....	....	2.35	2.75	2.75	3.00	3.25	3.45	3.65	4.15	4.90	5.75	6.70	7.75	8.90
2 3/4	....	....	....	....	....	....	2.75	3.25	3.25	3.40	3.65	3.85	4.15	4.75	5.55	6.45	7.45	8.60	9.85
3	....	....	....	....	....	....	3.25	3.75	3.75	3.90	4.25	4.65	5.15	5.75	6.50	7.45	8.50	9.70	11.00
3 1/4	....	....	....	....	....	....	....	....	4.80	5.00	5.25	6.00	6.50	7.00	7.90	8.80	10.00	11.30	13.00
3 1/2	....	....	....	....	....	....	....	....	5.50	5.75	6.05	6.80	7.50	8.25	9.00	10.10	11.70	13.20	15.00
3 3/4	....	....	....	....	....	....	....	....	....	6.40	6.75	7.55	8.40	9.25	10.75	12.55	13.25	14.70	17.50
4	....	....	....	....	....	....	....	....	....	7.00	7.50	8.25	9.60	10.25	11.50	13.50	14.75	16.50	20.50

BRASS MACHINE SCREWS.

PER GROSS.

	56	48	32, 36, 40		30, 32			24, 30, 32		20, 24		16 18 20	16, 18			14, 16			
	2	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30
Inch																			
3/16	$ .32	.32	.32	.40	.40	.58	.58	.86	.86	....	....	....	....	....	....	....	....	....	....
1/4	.32	.32	.32	.40	.40	.58	.58	.86	.86	.90	1.15	1.55	....	....	....	....	....	....	....
5/16	.35	.35	.35	.43	.43	.62	.62	.86	.86	1.00	1.55	2.00	....	....	....	....	....	....	....
3/8	.35	.35	.35	.43	.43	.62	.62	.86	.86	1.00	1.55	2.00	2.55	3.00	3.60	....	....	....	....
7/16	.39	.39	.39	.48	.48	.68	.68	.95	.95	1.15	1.70	2.10	3.00	3.60	4.60	....	....	....	....
1/2	.39	.39	.39	.48	.48	.68	.68	.95	.95	1.15	1.70	2.10	3.00	3.60	4.60	6.00	....	....	....
9/16	.48	.48	.48	.57	.57	.77	.77	1.05	1.05	1.30	1.90	2.35	3.25	3.90	4.90	6.30	....	....	....
5/8	.48	.48	.48	.57	.57	.77	.77	1.05	1.05	1.30	1.90	2.35	3.25	3.90	4.90	6.30	....	....	....
3/4	.60	.60	.60	.70	.70	.90	.90	1.15	1.15	1.50	2.10	2.60	3.50	4.20	5.40	6.70	8.10	....	....
7/8	....	....	.72	.80	.80	1.05	1.05	1.35	1.35	1.80	2.30	2.90	3.75	4.70	5.95	7.40	9.00	11.25	....
1	....	....	.80	.90	.90	1.20	1.20	1.55	1.55	2.10	2.60	3.20	4.00	5.20	6.70	8.50	10.60	13.00	15.75
1 1/8	....	....	1.00	1.20	1.20	1.50	1.50	1.90	1.90	2.55	3.10	3.70	4.50	6.00	7.75	9.90	12.45	15.40	18.75
1 1/4	....	....	1.00	1.20	1.20	1.50	1.50	1.90	1.90	2.55	3.10	3.70	4.50	6.00	7.75	9.90	12.45	15.40	18.75
1 3/8	....	....	1.50	1.70	1.90	2.10	2.10	2.50	2.50	3.00	3.60	4.30	5.00	6.80	8.90	11.55	14.70	18.35	22.50
1 1/2	....	....	1.50	1.70	1.90	2.10	2.10	2.50	2.50	3.00	3.60	4.30	5.00	6.80	8.90	11.55	14.70	18.35	22.50
1 3/4	....	....	....	....	2.50	2.70	2.70	3.10	3.10	3.50	4.15	5.00	5.50	7.50	9.85	12.70	16.05	20.40	24.25
2	....	....	....	....	3.30	3.50	3.70	4.00	4.00	4.40	4.90	5.75	6.30	8.25	10.60	13.55	17.10	21.80	26.00
2 1/4	....	....	....	....	....	....	4.50	5.00	5.00	5.50	6.00	6.65	7.50	9.25	11.80	14.95	18.70	23.05	28.00
2 1/2	....	....	....	....	....	....	6.00	6.50	6.50	7.00	7.50	8.00	9.00	10.50	12.50	15.50	19.80	25.35	30.50
2 3/4	....	....	....	....	....	....	6.50	7.00	7.50	8.00	9.00	10.00	11.00	12.00	14.00	17.00	21.80	27.50	33.00
3	....	....	....	....	....	....	7.50	8.00	8.50	9.00	10.00	11.00	12.50	14.00	16.00	19.00	24.10	29.70	36.00
3 1/4	....	....	....	....	....	....	....	....	12.50	13.00	14.00	15.25	17.50	19.80	21.00	22.50	28.00	33.75	39.50
3 1/2	....	....	....	....	....	....	....	....	14.00	15.00	16.75	18.00	19.65	22.15	22.75	25.50	31.40	37.50	42.75

IRON SET SCREWS.

PRICE PER 100.

Length under Head to Extreme Point.	Diameter of Screw.	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1	1⅛	1¼
¾		$2.00	$2.20	$2.50	$2.90	$3.40	$4.25	$5.00					
1		2.15	2.35	2.65	3.10	3.60	4.25	5.00	$7.00				
1¼		2.30	2.50	2.80	3.30	3.80	4.50	5.25	7.00	$11.30			
1½		2.45	2.65	2.95	3.50	4.00	4.75	5.50	7.50	11.30	$14.90		
1¾		2.60	2.80	3.10	3.70	4.20	5.00	5.75	8.00	12.00	15.90	$19.50	
2		2.80	3.00	3.30	3.95	4.45	5.30	6.05	8.60	12.90	17.00	21.10	$25.30
2¼		3.05	3.25	3.55	4.25	4.75	5.65	6.40	9.30	13.80	18.40	22.90	27.40
2½		3.30	3.55	3.85	4.60	5.10	6.05	6.80	10.00	14.80	19.80	24.70	29.60
2¾		3.55	3.85	4.20	5.00	5.50	6.50	7.25	10.80	15.90	21.40	26.70	32.00
3		3.80	4.15	4.55	5.45	5.95	7.00	7.75	11.70	17.10	23.00	28.80	34.60
3¼		.....	4.45	4.90	5.90	6.45	7.55	8.35	12.70	18.40	24.70	31.00	37.40
3½		.....	.....	5.25	6.35	6.95	8.10	8.95	13.70	19.70	26.40	33.20	40.20
3¾		.....	.....	.....	6.80	7.45	8.65	9.55	14.70	21.00	28.10	35.40	43.00
4		.....	.....	.....	.....	7.95	9.20	10.15	15.70	22.30	29.80	37.60	45.80
4¼		.....	.....	.....	.....	.....	9.75	10.75	16.70	23.60	31.50	39.80	48.60
4½		.....	.....	.....	.....	.....	.....	11.35	17.70	24.90	33.20	42.00	51.40
4¾		.....	.....	.....	.....	.....	.....	.....	18.70	26.20	34.90	44.20	54.20
5		.....	.....	.....	.....	.....	.....	.....	.....	27.50	36.60	46.40	57.00
Threads to Inch		20	18	16	14	12	12	11	10	9	8	7	7
Add for each ¼ inch		$0.25	.30	.35	.45	.50	.55	.60	1.00	1.30	1.70	2.20	2.80

STEEL SET SCREWS.

PRICE PER 100.

Length under Head to Extreme Point.	Diameter of Screw.	¼	5/16	⅜	7/16	½	9/16	⅝	¾	⅞	1	1⅛	1¼
¾		$2.50	$2.75	$3.10	$3.60	$4.25	$5.30	$6.25					
1		2.65	2.90	3.30	3.90	4.50	5.30	6.25	$8.75				
1¼		2.85	3.10	3.50	4.15	4.75	5.60	6.55	8.75	$14.10			
1½		3.05	3.30	3.70	4.40	5.00	5.90	6.90	9.35	14.10	$18.60		
1¾		3.25	3.50	3.90	4.65	5.25	6.25	7.25	10.00	15.00	19.80	$24.40	
2		3.50	3.75	4.15	4.95	5.55	6.60	7.60	10.75	16.10	21.25	26.35	$31.60
2¼		3.80	4.05	4.45	5.30	5.90	7.05	8.00	11.60	17.25	23.00	28.60	34.25
2½		4.10	4.45	4.80	5.75	6.35	7.55	8.50	12.50	18.50	24.70	30.85	37.00
2¾		4.45	4.80	5.25	6.20	6.85	8.10	9.05	13.50	19.85	26.65	33.40	40.00
3		4.75	5.20	5.70	6.75	7.45	8.75	9.70	14.60	21.35	28.75	36.00	43.25
3¼		.....	5.55	6.10	7.30	8.05	9.45	10.45	15.85	23.00	30.85	38.75	46.75
3½		.....	.....	6.55	7.90	8.70	10.15	11.20	17.10	24.60	33.25	41.50	50.25
3¾		.....	.....	.....	8.50	9.35	10.85	11.95	18.35	26.25	35.15	44.30	53.75
4		.....	.....	.....	.....	9.95	11.50	12.70	19.60	27.85	37.25	47.00	57.25
4¼		.....	.....	.....	.....	.....	12.20	13.45	20.85	29.50	39.40	49.75	60.75
4½		.....	.....	.....	.....	.....	.....	14.20	22.10	31.00	41.50	52.50	64.30
4¾		.....	.....	.....	.....	.....	.....	.....	23.40	32.75	43.60	55.25	67.95
5		.....	.....	.....	.....	.....	.....	.....	.....	34.40	45.75	58.00	71.25
Threads to Inch		20	18	16	14	12	12	11	10	9	8	7	7
Add for each ¼ inch		$0.35	.40	.50	.60	.70	.80	.90	1.30	1.75	2.30	3.00	3.75

SQUARE HEAD CAP SCREWS.

PRICE PER 100.

Diameter of Head.	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8
Length of Head.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/2	7/8	1	1 1/8	1 1/4	1 3/8
Diameter of Screw.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8
Length under Head to Extreme Point.													
3/4	2 40	2 75	3 20	3 80	4 40	5 75							
1	2 60	2 95	3 40	4 00	4 70	5 75	7 70						
1 1/4	2 75	3 10	3 65	4 20	4 95	6 05	7 70	10 50					
1 1/2	2 90	3 30	3 85	4 45	5 25	6 35	8 25	10 50	14 00				
1 3/4	3 05	3 50	4 10	4 70	5 55	6 65	8 80	11 10	14 80	18 00			
2	3 25	3 70	4 35	4 95	5 90	7 05	9 40	11 80	15 70	19 00	22 50		
2 1/4	3 50	4 00	4 65	5 25	6 30	7 55	10 10	12 60	16 70	20 20	24 00	30 00	
2 1/2	3 75	4 35	5 00	5 60	6 75	8 15	10 90	13 50	17 80	21 50	25 80	32 00	39 00
2 3/4	4 00	4 70	5 45	6 00	7 25	8 85	11 80	14 60	19 10	23 10	27 90	34 20	41 50
3	4 25	5 05	5 90	6 55	7 80	9 65	12 80	15 90	20 60	25 00	30 50	37 00	45 00
3 1/4		5 40	6 35	7 10	8 45	10 55	14 00	17 40	22 40	27 30	33 50	40 50	49 00
3 1/2			6 80	7 65	9 10	11 45	15 20	18 90	24 20	29 60	36 50	44 00	53 00
3 3/4				8 20	9 75	12 35	16 40	20 40	26 00	31 90	39 50	47 50	57 00
4					10 40	13 25	17 60	21 90	27 80	34 20	42 50	51 00	61 00
4 1/2						14 15	18 80	23 40	29 60	36 50	45 50	54 50	65 00
4 1/2							20 00	24 90	31 40	38 80	48 50	58 00	69 00
4 3/4								26 40	33 20	41 10	51 50	61 50	73 00
5									35 00	43 40	54 50	65 00	77 00
Threads to inch.	20	18	16	14	12	12	11	10	9	8	7	7	6
Add for each 1/4 inch.	25	35	45	55	65	90	1 20	1 50	1 80	2 30	3 00	3 50	4 00

HEXAGON HEAD CAP SCREWS.

Price Per 100.

Length under Head to Extreme Point.	Diameter of Head.	7/16	1/2	9/16	5/8	3/4	13/16	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
	Length of Head.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
	Diameter of Screw.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
	3/4	3 00	3 25	3 75	4 40	5 50	7 00						
	1	3 25	3 50	4 00	4 70	5 70	7 00	9 50					
	1 1/4	3 50	3 75	4 25	5 00	6 00	7 50	9 50	12 20				
	1 1/2	3 75	4 00	4 50	5 30	6 30	8 00	10 00	12 20	16 00			
	1 3/4	4 00	4 25	4 75	5 60	6 60	8 50	10 60	12 80	16 60	21 20		
	2	4 25	4 60	5 05	5 95	7 00	9 10	11 20	13 40	17 20	22 30	29 00	37 50
	2 1/4	4 55	5 00	5 40	6 35	7 50	9 70	11 90	14 10	17 90	23 60	30 50	39 30
	2 1/2	4 85	5 40	5 80	6 80	8 00	10 40	12 70	14 90	18 80	25 10	32 30	41 40
	2 3/4	5 15	5 80	6 30	7 30	8 60	11 20	13 60	15 90	20 00	26 90	34 40	44 00
	3	5 45	6 20	6 80	7 90	9 30	12 10	14 70	17 00	21 80	29 00	37 00	47 50
	3 1/4		6 60	7 30	8 50	10 10	13 10	16 00	18 60	23 80	31 40	40 00	51 50
	3 1/2			7 80	9 10	10 90	14 10	17 30	20 20	25 80	33 80	43 00	55 50
	3 3/4				9 70	11 70	15 10	18 60	21 80	27 80	36 20	46 00	59 50
	4					12 50	16 10	19 90	23 40	29 80	38 60	49 00	63 50
	4 1/4						17 10	21 20	25 00	31 80	41 00	52 00	67 50
	4 1/2							22 50	26 60	33 80	43 40	55 00	71 50
	4 3/4								28 20	35 80	45 80	58 00	75 50
	5									37 80	48 20	61 00	79 50
	Threads to inch.	20	18	16	14	12	12	11	10	9	8	7	7
	Add for each 1/4 inch.	30	40	50	60	80	1 00	1 30	1 60	2 00	2 40	3 00	4 00

ROUND AND FILISTER HEAD CAP SCREWS.

PRICE PER 100.

Diameter of Head	1/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4
Length of Head	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1
Diameter of Screw	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1
Length under Head to Extreme Point. 3/4	$2.00	2.25	2.50	3.00	3.50	4.00	5.00						
1	2.25	2.50	2.75	3.25	3.75	4.25	5.30	6.60					
1 1/4	2.50	2.75	3.00	3.50	4.00	4.50	5.60	6.90	9.00				
1 1/2	2.75	3.00	3.25	3.75	4.25	4.75	5.90	7.20	9.50	12.00			
1 3/4	3.00	3.25	3.50	4.00	4.50	5.00	6.20	7.50	10.00	12.50	15.25		
2	3.25	3.50	3.75	4.35	5.00	5.50	6.75	8.00	10.75	13.00	16.00	19.20	
2 1/4	3.50	3.75	4.00	4.75	5.50	6.00	7.25	8.50	11.50	13.75	16.75	20.20	
2 1/2	3.75	4.00	4.25	5.15	6.00	6.50	7.75	9.00	12.00	14.50	17.50	21.25	
2 3/4		4.25	4.50	5.55	6.50	7.00	8.25	9.50	12.75	15.25	18.30	22.40	
3			4.75	5.95	7.00	7.50	8.75	10.00	13.50	16.00	19.10	23.60	
3 1/4				6.35	7.50	8.00	9.25	10.50	14.25	16.75	20.00	24.85	
3 1/2					8.00	8.50	9.75	11.00	15.00	17.50	21.00	26.10	
3 3/4						9.00	10.25	11.50	15.75	18.25	22.00	27.35	
4							10.75	12.00	16.50	19.00	23.00	28.60	
4 1/4								12.50	17.25	19.75	24.00	29.85	
4 1/2									18.00	20.50	25.00	31.10	
4 3/4										21.25	26.00	32.35	
5											27.00	33.60	
Threads to inch	40	24	20	18	16	14	12	12	11	10	9	8	
Add for each 1/4 inch	25	25	25	40	50	50	50	50	75	75	1.00	1.25	

FLAT HEAD CAP SCREWS.

MILLED FROM SOLID BAR.

PRICE PER 100.

Diameter of Head	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
Diameter of Screw	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Length over All. 3/4	$2.25	$2.50	$3.10	$4.00	$5.00				
1	2.50	2.75	3.35	4.25	5.30	6.60			
1 1/4	2.75	3.00	3.60	4.50	5.60	6.90	$ 9.00		
1 1/2	3.00	3.25	3.85	4.75	5.90	7.20	9.50	$12.00	
1 3/4	3.25	3.50	4.10	5.00	6.20	7.50	10.00	12.50	$14.50
2		3.75	4.35	5.50	6.75	8.00	10.75	13.00	15.25	$19.20
2 1/4			4.75	6.00	7.25	8.50	11.50	13.75	16.00	20.20
2 1/2				6.50	7.75	9.00	12.00	14.50	16.75	21.25
2 3/4				7.00	8.25	9.50	12.75	15.25	17.50	22.40
3					8.75	10.00	13.50	16.00	18.30	23.60
Threads to inch	40	24	20	18	16	14	12	12	11	10
Add for each 1/4 inch	25	25	40	50	50	50	50	75	1.00	1.25

BUTTON HEAD CAP SCREWS.

MILLED FROM SOLID BAR.

PRICE PER 100.

Diameter of Head.	*No. Full.	1/8	5/32	3/16	7/32	1/4	9/32	5/16	3/8	7/16
Diameter of Body.	1/8	5/32	3/16	7/32	1/4	9/32	5/16	3/8	7/16	1/2
Length under Head to Extreme Point. 3/4	2 25	2 50	3 00	3 50	4 00	5 00				
1	2 50	2 75	3 25	3 75	4 25	5 30	6 60			
1 1/4	2 75	3 00	3 50	4 00	4 50	5 60	6 90	9 00		
1 1/2	3 00	3 25	3 75	4 25	4 75	5 90	7 20	9 50	12 00	
1 3/4	3 25	3 50	4 00	4 50	5 00	6 20	7 50	10 00	12 50	18 20
2	.....	3 75	4 35	5 00	5 50	6 75	8 00	10 75	13 00	19 20
2 1/4	.....	.....	4 75	5 50	6 00	7 25	8 50	11 50	13 75	20 20
2 1/2	.....	.....	.....	6 00	6 50	7. 75	9 00	12 00	14 50	21 25
2 3/4	.....	.....	.....	.....	7 00	8 25	9 50	12 75	15 25	22 40
3	.....	.....	.....	.....	.....	8 75	10 00	13 50	16 00	23 60
Threads to inch.	40	24	20	18	16	14	12	12	11	10
Add for each 1/4 in.	25	25	40	50	50	60	50	75	75	1 15

*No. 4 Wire.

COLLAR SCREWS.

PRICE PER 100.

Diam. of Collar.	1/4	11/32	3/8	1/2	5/8	11/16	3/4	13/16	1	1 1/4
Diam. of Screw.	1/8	5/32	3/16	7/32	9/32	5/16	3/8	7/16	5/8	3/4
Length under Head to Extreme Point. 3/4	2 50	2 80	3 10	3 75	4 40	5 00	6 25			
1	2 80	3 10	3 40	4 05	4 70	5 30	6 60	8 25		
1 1/4	3 10	3 40	3 70	4 35	5 00	5 60	7 00	8 60	11 25	
1 1/2	3 40	3 70	4 00	4 70	5 30	5 95	7 40	9 00	11 90	15 00
1 3/4	3 70	4 05	4 35	5 05	5 65	6 35	7 80	9 45	12 60	15 60
2	.....	4 40	4 70	5 45	6 25	6 85	8 40	10 00	13 35	16 25
2 1/4	.....	.....	5 05	5 95	6 85	7 40	9 00	10 60	14 15	17 10
2 1/2	.....	.....	5 45	6 45	7 55	8 05	9 60	11 25	15 00	18 00
2 3/4	.....	.....	.....	6 95	8 20	8 75	10 30	11 90	15 90	19 00
3	.....	.....	.....	7 50	8 85	9 50	11 00	12 60	16 85	20 00
3 1/4	.....	.....	.....	.....	9 50	10 30	11 80	13 40	17 95	21 20
3 1/2	.....	.....	.....	.....	10 20	11 10	12 60	14 30	19 10	22 60
3 3/4	.....	.....	.....	.....	.....	11 95	13 50	15 30	20 40	24 20
4	.....	.....	.....	.....	.....	12 80	14 40	16 30	21 70	25 80
4 1/4	.....	.....	.....	.....	.....	.....	15 40	17 50	23 20	27 70
4 1/2	.....	.....	.....	.....	.....	.....	16 40	18 70	24 70	29 60
4 3/4	.....	.....	.....	.....	.....	.....	.....	20 10	26 50	31 80
5	.....	.....	.....	.....	.....	.....	.....	21 50	28 30	34 00
Threads to inch.	40	24	20	18	16	14	12	12	11	10
Add for each 1/4 in.	30	40	50	60	80	1 00	1 30	1 60	2 00	2 40

COACH OR LAG SCREWS.

PRICE PER HUNDRED.

Length Under Head, Inches.	5/16	3/8	7/16	1/2	9/16 and 5/8	3/4	7/8	1
1½	$2.25	$2.70	$3.15	$3.75	.....	.....	.....	.....
2	2.45	2.96	3.47	4.11	$5.00	.....	.....	.....
2½	2.65	3.22	3.79	4.47	5.50	$7.90	.....	.....
3	2.85	3.48	4.11	4.83	6.00	8.60	$12.50	.....
3½	3.05	3.74	4.43	5.19	6.50	9.30	13.50	$18.20
4	3.25	4.00	4.75	5.55	7.00	10.00	14.50	19.50
4½	3.45	4.26	5.07	5.91	7.50	10.70	15.50	20.80
5	3.65	4.52	5.39	6.27	8.00	11.40	16.50	22.10
5½	3.85	4.78	5.71	6.63	8.50	12.10	17.50	23.40
6	4.05	5.04	6.03	6.99	9.00	12.80	18.50	24.70
6½	.....	.....	6.35	7.35	9.50	13.50	19.50	26.00
7	.....	.....	6.67	7.71	10.00	14.20	20.50	27.30
7½	.....	.....	6.99	8.07	10.50	14.90	21.50	28.60
8	.....	.....	7.31	8.43	11.00	15.60	22.50	29.90
9	.....	.....	7.95	9.15	12.00	17.00	24.50	32.50
10	.....	.....	.....	9.87	13.00	18.40	26.50	35.10
11	.....	.....	.....	10.59	14.00	19.80	28.50	37.70
12	.....	.....	.....	11.31	15.00	21.20	30.50	40.30

The following extras are to be understood as a part of this list
Hexagon and Tee Heads, 10 per cent. extra.
Skein Screws sold at the same price as Lag Screws.

HANGER SCREWS.

PRICE PER HUNDRED

Length, Inches	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
3	$5.00	$5.75						
4	.....	6.50						
5	.....	7.50	$9.50					
6	.....	8.00	10.50	$13.00	$16.00			
7	.....	8.50	11.25	14.50	18.00	$25.00		
8	.....	9.00	12.00	15.50	19.50	27.00	$36.00	
9	.....	.....	12.75	16.50	21.00	28.50	38.50	$52.00
10	.....	.....	13.50	17.50	22.00	30.00	41.00	56.00
11	.....	.....	.....	18.25	23.00	31.50	43.00	59.50
12	.....	.....	.....	19.00	24.00	33.00	45.00	63.00
14	.....	.....	.....	.....	.....	35.50	49.00	69.00
16	.....	.....	.....	.....	.....	.....	.....	75.00

BOLTS.—

CARRIAGE BOLTS.

Adopted January 22, 1902, to take effect February 1, 1902.

PRICE PER HUNDRED.

Length.	¼	5/16	⅜	7/16	½	9/16 & 5/8	¾
1½	$1.00	$1.20	$1.60	$2.20	.....	.....	.....
1¾	1.04	1.25	1.68	2.29	.....	.....	.....
2	1.08	1.30	1.76	2.38	.....	.....	.....
2¼	1.12	1.35	1.84	2.47	.....	.....	.....
2½	1.16	1.40	1.92	2.56	$3.00	$5.20	$7.20
2¾	1.20	1.45	2.00	2.65	3.11	5.37	7.43
3	1.24	1.50	2.08	2.74	3.22	5.54	7.66
3¼	1.28	1.55	2.16	2.83	3.33	5.71	7.89
3½	1.32	1.60	2.24	2.92	3.44	5.88	8.12
3¾	1.36	1.65	2.32	3.01	3.55	6.05	8.35
4	1.40	1.70	2.40	3.10	3.66	6.22	8.58
4¼	1.44	1.75	2.48	3.19	3.77	6.39	8.81
4½	1.48	1.80	2.56	3.28	3.88	6.56	9.04
4¾	1.52	1.85	2.64	3.37	3.99	6.73	9.27
5	1.56	1.90	2.72	3.46	4.10	6.90	9.50
5½	1.64	2.00	2.88	3.64	4.32	7.24	9.96
6	1.72	2.10	3.04	3.82	4.54	7.58	10.42
6½	1.80	2.20	3.20	4.00	4.76	7.92	10.88
7	1.88	2.30	3.36	4.18	4.98	8.26	11.34
7½	1.96	2.40	3.52	4.36	5.20	8.60	11.80
8	2.04	2.50	3.68	4.54	5.42	8.94	12.26
8½	2.12	2.60	3.84	4.72	5.64	9.28	12.72
9	2.20	2.70	4.00	4.90	5.86	9.62	13.18
9½	2.28	2.80	4.16	5.08	6.08	9.96	13.64
10	2.36	2.90	4.32	5.26	6.30	10.30	14.10
11	2.52	3.10	4.64	5.62	6.74	10.98	15.02
12	2.68	3.30	4.96	5.98	7.18	11.66	15.94
13	2.84	3.50	5.28	6.34	7.62	12.34	16.86
14	3.00	3.70	5.60	6.70	8.06	13.02	17.78
15	3.16	3.90	5.92	7.06	8.50	13.70	18.70
16	3.32	4.10	6.24	7.42	8.94	14.38	19.62
17	3.48	4.30	6.56	7.78	9.38	15.06	20.54
18	3.64	4.50	6.88	8.14	9.82	15.74	21.46
19	3.80	4.70	7.20	8.50	10.26	16.42	22.38
20	3.96	4.90	7.52	8.86	10.70	17.10	23.30

PLANER HEAD BOLTS.

PRICE PER 100 WITHOUT NUTS. (IRON.)

Diameter of Head	⅜	1	1⅛	1¼	1⅜
Length of Head	3/16	¼	⅜	⅜	7/16
Diameter of Screw	½	9/16	⅝	¾	¾
Length under Head to extreme point: 1	$10.00	.....	.....	.....	.....
1¼	10.50	12.00	13.30	13.30	17.00
1½	10.50	12.25	14.00	14.00	17.50
1¾	.....	12.45	14.80	14.80	18.00
2	.....	13.75	15.70	15.70	19.00
Finished Case Hardened Hexagon Nuts for above	10.00	12.00	15.00	16.00	18.00

For Norway or Swedes iron or steel add 25 per cent.

ODD LENGTHS.—If one-eighth inch or more is added, price is same as if full quarter were added. Less than one-eighth, no extra charge.

FINISHED

BLANK.

BOILER PATCH BOLTS.

PRICE PER HUNDRED, TURNED AND THREADED

Diameter, inches	½	⅝	¾	⅞	1
Length from largest diameter of bevel to point, 3/4 inch.	$3.75	$4.25	.....	.....	.....
" " " " " 7/8 "	4.00	4.50	$6.00	.....	.....
" " " " " 1 "	4.25	4.80	6.60	$9.50	$13.50
" " " " " 1⅛ "	.....	5.10	6.80	9.85	14.00
" " " " " 1¼ "	.....	5.50	7.25	10.25	14.75
" " " " " 1⅜ "	.....	6.30	8.15	11.15	16.25
Threads to inch	12	12	12	12	12
Blanks	½	⅝	¾	⅞	1
Price per pound, in lots of 25 pounds or over	$0.25	0.20	0.19	0.18	0.17

MACHINE BOLTS.

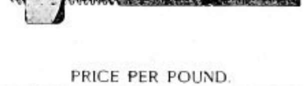
PRICE PER HUNDRED.

Length Under Head.	¼	5/16	⅜	7/16	½	9/16 and ⅝	¾	⅞	1	1⅛	1¼
1½	$1.70	$2.00	$2.40	$2.80	$3.60	$5.20	$7.20	$10.50	....	....	....
2	1.78	2.12	2.56	3.00	3.86	5.58	7.70	11.20	$16.00	....	....
2½	1.86	2.24	2.72	3.20	4.12	5.96	8.20	11.90	16.90	$24.90	....
3	1.94	2.36	2.88	3.40	4.38	6.34	8.70	12.60	17.80	26.10	$34.50
3½	2.02	2.48	3.04	3.60	4.64	6.72	9.20	13.30	18.70	27.30	36.00
4	2.10	2.60	3.20	3.80	4.90	7.10	9.70	14.00	19.60	28.50	37.50
4½	2.18	2.72	3.36	4.00	5.16	7.48	10.20	14.70	20.50	29.70	39.00
5	2.26	2.84	3.52	4.20	5.42	7.86	10.70	15.40	21.40	30.90	40.50
5½	2.34	2.96	3.68	4.40	5.68	8.24	11.20	16.10	22.30	32.10	42.00
6	2.42	3.08	3.84	4.60	5.94	8.62	11.70	16.80	23.20	33.30	43.50
6½	2.50	3.20	4.00	4.80	6.20	9.00	12.20	17.50	24.10	34.50	45.00
7	2.58	3.32	4.16	5.00	6.46	9.38	12.70	18.20	25.00	35.70	46.50
7½	2.66	3.44	4.32	5.20	6.72	9.76	13.20	18.90	25.90	36.90	48.00
8	2.74	3.56	4.48	5.40	6.98	10.14	13.70	19.60	26.80	38.10	49.50
9	2.90	3.80	4.80	5.80	7.50	10.90	14.70	21.00	28.60	40.50	52.50
10	3.06	4.04	5.12	6.20	8.02	11.66	15.70	22.40	30.40	42.90	55.50
11	3.22	4.28	5.44	6.60	8.54	12.42	16.70	23.80	32.20	45.30	58.50
12	3.38	4.52	5.76	7.00	9.06	13.18	17.70	25.20	34.00	47.70	61.50
13	....	....	6.08	7.40	9.58	13.94	18.70	26.60	35.80	50.10	64.50
14	....	....	6.40	7.80	10.10	14.70	19.70	28.00	37.60	52.50	67.50
15	....	....	6.72	8.20	10.62	15.46	20.70	29.40	39.40	54.90	70.50
16	....	....	7.04	8.60	11.14	16.22	21.70	30.80	41.20	57.30	73.50
17	....	....	....	....	11.66	16.98	22.70	32.20	43.00	59.70	76.50
18	....	....	....	....	12.18	17.74	23.70	33.60	44.80	62.10	79.50
19	....	....	....	....	12.70	18.50	24.70	35.00	46.60	64.50	82.50
20	....	....	....	....	13.22	19.26	25.70	36.40	48.40	66.90	85.50
21	....	....	....	....	....	....	26.70	37.80	50.20	69.30	88.50
22	....	....	....	....	....	....	27.70	39.20	52.00	71.70	91.50
23	....	....	....	....	....	....	28.70	40.60	53.80	74.10	94.50
24	....	....	....	....	....	....	29.70	42.00	55.60	76.50	97.50
25	....	....	....	....	....	....	30.70	43.40	57.40	78.90	100.50
26	....	....	....	....	....	....	31.70	44.80	59.20	81.30	103.50
27	....	....	....	....	....	....	32.70	46.20	61.00	83.70	106.50
28	....	....	....	....	....	....	33.70	47.60	62.80	86.10	109.50
29	....	....	....	....	....	....	34.70	49.00	64.60	88.50	112.50
30	....	....	....	....	....	....	35.70	50.40	66.40	90.90	115.50

Bolts with Hexagon Head or Hexagon Nuts, 10 per cent extra. If both Hexagon Head and Hexagon Nuts, 20 per cent extra. Joint Bolts with Oblong Nuts, Bolts with Tee Heads, Askew Heads and Eccentric Heads, 10 per cent extra.

BOLT ENDS

FITTED WITH SQUARE NUTS.



PRICE PER POUND.

SIZE OF IRON .... Inches	5/16	⅜	7/16	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2
Length in Inches........	6	7	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Price per Pound........	$0.20	.18	.16	.14	.12	.10	.10	.10	.10	.11	.11	.11	.12	.12	.12	.12

The following extras are to be understood as part of this list With Hexagon Nuts, 10 per cent. extra.

Bolt Ends ordered shorter than above Standard lengths will be charged at the price per hundred of Machine Bolts of same length, subject to same discount.

BOLTS

FLAT HEAD STOVE BOLTS.

PRICE PER HUNDRED.

ROUND HEAD STOVE BOLTS.

PRICE PER HUNDRED.

Revised List of December 28, 1899.

FLAT HEAD.					ROUND HEAD.				
Length.	3/16 and 7/32	1/4 and 5/16	3/8	7/16	Length.	3/16 and 7/32	1/4 and 5/16	3/8	7/16
3/8	$ 75	$ 90	$1.30	$2.50	3/8	$ .85	$1.00	$1.55	$2.65
1/2	.75	.90	1.30	2.50	1/2	.85	1.00	1.55	2.65
5/8	.75	.90	1.30	2.50	5/8	.85	1.00	1.55	2.65
3/4	.75	.90	1.30	2.50	3/4	.85	1.00	1.55	2.65
7/8	.80	.95	1.35	2.55	7/8	.90	1.05	1.60	2.70
1	.80	.95	1.40	2.60	1	.90	1.06	1.65	2.75
1 1/8	.85	1.00	1.45	2.65	1 1/8	.95	1.10	1.70	2.80
1 1/4	.85	1.00	1.50	2.70	1 1/4	.95	1.10	1.75	2.85
1 3/8	.90	1.05	1.60	2.80	1 3/8	1.00	1.15	1.80	2.90
1 1/2	.90	1.05	1.70	2.90	1 1/2	1.00	1.15	1.85	2.95
1 3/4	.95	1.10	1.80	3.00	1 3/4	1.05	1.20	1.95	3.05
2	1.00	1.15	1.90	3.10	2	1.10	1.25	2.05	3.20
2 1/4	1.05	1.20	2.00	3.20	2 1/4	1.15	1.30	2.15	3.35
2 1/2	1.10	1.25	2.10	3.30	2 1/2	1.20	1.35	2.25	3.50
2 3/4	1.15	1.30	2.20	3.40	2 3/4	1.25	1.40	2.35	3.65
3	1.20	1.35	2.30	3.50	3	1.30	1.45	2.45	3.80
3 1/4	1.25	1.40	2.40	3.60	3 1/4	1.35	1.50	2.55	3.95
3 1/2	1.30	1.45	2.50	3.70	3 1/2	1.40	1.55	2.65	4.10
3 3/4	1.35	1.50	2.60	3.80	3 3/4	1.45	1.60	2.75	4.25
4	1.40	1.55	2.70	3.90	4	1.50	1.65	2.85	4.40
4 1/4	1.45	1.60	2.80	4.05	4 1/4	1.55	1.70	2.95	4.55
4 1/2	1.50	1.65	2.90	4.20	4 1/2	1.60	1.75	3.05	4.70
4 3/4	1.55	1.70	3.00	4.35	4 3/4	1.65	1.80	3.15	4.85
5	1.60	1.75	3.10	4.50	5	1.70	1.85	3.25	5.00
5 1/4	1.65	1.80	3.20	4.65	5 1/4	1.75	1.90	3.35	5.15
5 1/2	1.70	1.85	3.20	4.80	5 1/2	1.80	1.95	3.45	5.30
5 3/4	1.75	1.30	3.40	4.95	5 3/4	1.85	2.00	3.55	5.45
6	1.80	1.95	3.50	5.10	6	1.90	2.05	3.65	5.60

For Nickel Plating add $1.00 to List.

For Nickel Plating add $1.00 to List.

UNION TIRE BOLTS.

WITH FORGED NUTS.

PRICE PER HUNDRED.

Length, Inch.	Diameter, 7/16 Inch.	Diameter, 1/2 Inch.	Diameter, 9/16 Inch.	Diameter, 5/8 Inch.	Length, Inch.	Diameter 5/8 Inch.	Diameter, 7/8 Inch.	Diameter, 1/2 Inch.	Diameter, 9/16 Inch.	Diameter, 3/4 Inch.
1 1/4	$0.60	$0.80	$1.10	$2.20	1 1/4	$1.50	$1.50	$1.90		
1 1/2	.60	.80	1.10	2.20	1 1/2	1.50	1.50	2.00	$2.70	
1 3/4	.65	.85	1.10	2.20	1 3/4	1.50	1.50	2.15	2.85	
2	.70	.90	1.17	2.20	2	1.50	1.60	2.25	3.05	$5.00
2 1/4	.75	.95	1.24	2.30	2 1/4	1.50	1.65	2.40	3.20	5.20
2 1/2	.80	1.00	1.31	2.40	2 1/2	.....	1.75	2.50	3.35	5.40
2 3/4	.85	1.05	1.38	2.50	2 3/4	.....	1.80	2.65	3.50	5.60
3	.90	1.10	1.45	2.60	3	.....	1.90	2.75	3.65	5.80
3 1/4	.....	1.15	1.52	2.70	3 1/4	.....	2.00	2.90	3.80	6.00
3 1/2	.....	1.20	1.59	2.80	3 1/2	.....	2.10	3.00	3.95	6.20
3 3/4	.....	1.25	1.66	2.90	3 3/4	.....	.....	3.15	4.10	6.40
4	.....	1.30	1.73	3.00	4	.....	.....	3.25	4.25	6.60
4 1/2	.....	1.40	1.87	3.20	4 1/2	.....	.....	.....	4.55	7.00
5	.....	1.50	2.01	3.40	5	.....	.....	.....	4.90	7.40
5 1/2	.....	.....	2.15	3.60	5 1/2	.....	.....	.....	.....	7.80
6	.....	.....	2.29	3.80	6	.....	.....	.....	.....	8.00

SINK BOLTS.

PRICE PER HUNDRED.

Length	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
1/4	$1.30	1.35	1.40	1.45	1.50	1.55	1.60	1.65	1.70

PHILADELPHIA COLEMAN EAGLE TIRE BOLTS.

MADE FROM BEST NORWAY IRON.

Philadelphia Finish, with Forged Nuts and Finished Points.

PRICE PER HUNDRED.

BOLTS AND STUDS.

ROUGH STUD BOLTS.

With Chamfered and Trimmed Hexagon Nuts.

UNITED STATES STANDARD SIZES.

PRICE PER HUNDRED.

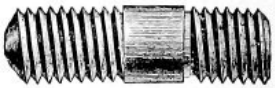
Diameter	⅜	⅞	½	⅝	¾	⅞	1	1⅛	1¼
No. of threads	16	14	12 or 13	12	11	10	9	8	7	7
1½	$4.00	5.10	5.50							
1¾	4.10	5.25	5.65							
2	4.20	5.40	5.80	8.50	8.50	12.40				
2¼	4.30	5.55	5.95	8.75	8.75	12.70				
2½	4.40	5.70	6.10	9.00	9.00	13.00	18.00			
2¾	4.50	5.85	6.25	9.25	9.25	13.30	18.50			
3	4.60	6.00	6.40	9.50	9.50	13.60	19.00	27.50		
3½	4.70	6.15	6.55	9.75	9.75	13.90	19.50	28.40		
3½	4.80	6.30	6.70	10.00	10.00	14.20	20.00	29.00	41.50	
3¾	4.90	6.45	6.85	10.25	10.25	14.50	20.50	29.60	42.25	
4	5.00	6.60	7.00	10.50	10.50	14.80	21.00	30.20	43.00	60.00
4½	5.25	6.90	7.30	11.00	11.00	15.40	22.00	31.40	44.50	62.50
5	.....	.....	7.60	11.50	11.50	16.00	23.00	32.60	46.00	65.00
5½	.....	.....	8.00	12.00	12.00	16.60	24.00	33.80	47.50	67.50
6	.....	.....	8.45	12.50	12.50	17.20	25.00	35.00	49.00	70.00
7	.....	.....	.....	13.60	13.60	18.60	27.00	37.50	52.00	75.50

Length over all.

Studs without Nuts will be charged at a reduction of 15 per cent. from list prices.

In ordering Studs, state whole length, and length of thread required at each end.

MILLED IRON STUDS.



PRICE PER HUNDRED

Diameter	⅜	⅞	½	⅝	¾	⅞	1	1⅛	1¼
1½	$3.35	4.05	4.40	5.10					
1½	3.50	4.20	4.60	5.30	6.10				
1¾	3.65	4.35	4.80	5.50	6.30				
2	3.80	4.50	5.00	5.70	6.50	8.80			
2¼	3.95	4.65	5.20	5.90	6.70	9.10			
2½	4.10	4.80	5.40	6.10	6.90	9.40	12.00		
2¾	4.25	4.95	5.60	6.30	7.10	9.70	12.50		
3	4.40	5.10	5.80	6.50	7.30	10.00	13.00	17.00	21.00
3¼	.....	5.25	6.00	6.70	7.50	10.30	13.50	17.75	22.00
3½	.....	5.40	6.20	6.90	7.70	10.60	14.00	18.50	23.00	27.00
3¾	.....	5.55	6.40	7.10	7.90	10.90	14.50	19.25	24.00	28.00
4	.....	.....	6.60	7.30	8.10	11.20	15.00	20.00	25.00	29.00
4½	.....	.....	6.70	7.40	8.25	11.45	15.40	20.50	25.75	29.75
4½	.....	.....	6.80	7.50	8.40	11.65	15.75	21.00	26.50	30.50
5	.....	.....	.....	7.60	8.55	11.90	16.15	21.50	27.25	31.25
5½	.....	.....	.....	7.70	8.70	12.10	16.50	22.00	28.00	32.00
6	.....	.....	.....	7.80	8.85	12.35	16.90	22.50	28.75	32.75
5½	.....	.....	.....	.....	9.00	12.55	17.25	23.00	29.50	33.50
5¾	.....	.....	.....	.....	9.15	12.80	17.65	23.50	30.25	34.25
6	.....	.....	.....	.....	9.30	13.00	18.00	24.00	31.00	35.00
Threads to in.	16	14	12	12	11	10	9	8	7	7
Add for each ¼ inch	15	20	20	20	25	30	40	60	75	100

Length of Studs.

COAL CAR OR PIT BOLTS.

PRICE PER HUNDRED.

LENGTH	½	⅝	LENGTH	½	⅝
1½ inch.	$7 00	$13 00	3½ inch	$ 8 75	$15 80
1¾ "	7 00	13 00	3¾ "	9 00	16 20
2 "	7 25	13 40	4 "	9 25	16 60
2¼ "	7 50	13 80	4¼ "	9 50	17 00
2½ "	7 75	14 20	4½ "	9 75	17 40
2¾ "	8 00	14 60	4¾ "	10 00	17 80
3 "	8 25	15 00	5 "	10 25	18 20
3¼ "	8 50	15 40	5½ "	10 75	19 00

BOLTS.—

PLOW AND CULTIVATOR BOLTS.

PRICE PER HUNDRED.

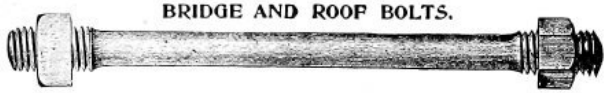
Length ..Inch	7/16	1/2	9/16	5/8	11/16	3/4
1¼ inch	$1 70	$2 00	$2 60	$3 50	$4 50	$5 70
1½ "	1 80	2 10	2 75	3 70	4 75	6 00
1¾ "	1 90	2 20	2 90	3 90	5 00	6 30
2 "	2 00	2 30	3 05	4 10	5 25	6 60
2¼ "	2 10	2 40	3 20	4 30	5 50	6 90
2½ "	2 20	2 50	3 35	4 50	5 75	7 20
2¾ "	2 30	2 60	3 50	4 70	6 00	7 50
3 "	2 40	2 70	3 65	4 90	6 25	7 80
3¼ "	2 50	2 80	3 80	5 10	6 50	8 10
3½ "	2 60	2 90	3 95	5 30	6 75	8 40
3¾ "	2 70	3 00	4 10	5 50	7 00	8 70
4 "	2 80	3 10	4 25	5 70	7 25	9 00

Concave Head — No. 8

Button Head — No. 9.

In ordering Plow Bolts, please state what style Heads are desired.
Right-hand Threads will be sent, unless Left-hand Threads are ordered.

BRIDGE AND ROOF BOLTS.



With square head on one end and square nut on the other, or square nut on each end, as preferred.

Price per lb. in Cents.

Length, feet.	DIAMETER, INCHES.			
	⅝	¾ to 1¼	1⅜ to 1½	1¾ to 2
1½ to 4	9 2	8 8	9 2	10
4 to 8	8 8	8 4	8 8	9 4
8 to 12	8 4	8	8 4	8 8
14 to 20	8	7 6	8	8 4

With both ends upset and fitted with hexagon nuts.

Price per lb. in Cents.

Length, feet.	DIAMETER, INCHES.			
	¾ to 1¼	1⅜ to 1½	1¾ to 2	2⅛ to 3
4 to 8	12	12 4	13 2	14 4
8 to 12	11	11 4	12 2	13 2
12 to 16	10	10 4	11 2	12 4
16 to 20	9 2	9 6	10 4	11 6

DRIFT BOLTS.

Round or square, to order only. With or without heads or points.

MANUFACTURERS' STANDARD LIST OF NET EXTRAS.

Adopted November 15, 1899.

Size of bolt, inch	¼	⅝	⅜	⅞	½	⅝ and ⅝	¾	⅞	1
Extreme length of thread, inches	¾	1⅛	1⅜	1⅝	1⅞	1⅞	2¼	2½	3
For each additional ¼ inch of thread . . per 100 bolts	$0.02	$0.02	$0.02½	$0.03	$0.04	$0.06	$0.08	$0.10	$0.12
For 1 extra square nut . . . . " 100 "	25	.35	.45	.55	.65	.85	1.35	2.00	3.00
For 1 " hexagon nut . . . . " 100 "	35	.45	.55	.70	.85	1.15	1.75	2.50	3.60
Size of nut, inch	⅜	½	⅝	¾	⅞	1	....	....	....
For 1 thumb or wing nut, in place of hexagon or square nut . . . . per 100 bolts.	$0.30	$0.40	$0.50	$0.60	$0.75	$0.90	....	....	....

ELEVATOR BUCKET BOLTS.

FAVORITE SLOTTED HEAD BOLTS.

This Bolt is provided with ribs under the head which is slotted and enables the latter to be held by a screw driver when the nut is turned.

PRICE LIST.

½ x ¼ inch	per 100, $1.00	⅝ x ¼ inch	per 100, $1.00
⅝ x ¼ inch	" 1.00	⅞ x ¼ inch	" 1.15

NORWAY OR FLAT HEAD BOLTS.

Our Norway Bolts are made with extra large thin flat heads very carefully finished.

PRICE LIST.

⅝ x ¼ inch	per 100,	$2.00
¾ x ¼ "	"	2.20
⅞ x ¼ "	"	2.30
1 x ¼ "	"	2.30
1 ¼ x ¼ "	"	2.40
1 ¼ x 5/16 "	"	2.75

CLINCH BOLT.

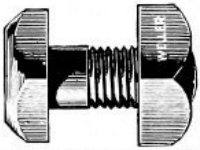
Price per hundred, including Burrs.....50c

BOLTS FOR CHAIN ATTACHMENTS.

Button Head for Light Chains.

PRICE LIST.—Button Head.

¼ x ⅝ inch	per 100, $1.00	¼ x ¾ "	" 1.00



Square Head for Heavy Chains.

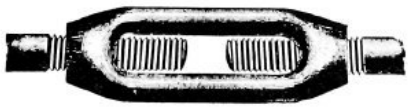
PRICE LIST.—Square Head.

5/16 x ¾ inch	per 100,	$2.00	
5/16 x 1 "	"	2.00	
⅜ x 1 "	"	2.25	

Leather Washers for bolts, 25c per hundred.

TURN BUCKLES.

WROUGHT IRON.



SIZE.	PRICE.	SIZE.	PRICE.	SIZE.	PRICE.	SIZE.	PRICE.
⅜ inch.	$0 40	1⅛ inch.	$1 00	1⅞ inch.	$2 25	2¾ inch.	$ 5 50
⅞ "	42	1¼ "	1 25	2 "	2 65	3 "	6 50
½ "	45	1⅜ "	1 38	2⅛ "	3 10	3¼ "	8 00
⅝ "	50	1½ "	1 50	2¼ "	3 50	3½ "	10 00
¾ "	63	1⅝ "	1 75	2⅜ "	4 00	3¾ "	15 00
⅞ "	75	1¾ "	2 00	2½ "	4 50	4 "	20 00
1 "	88						

All ordinary sizes carried in stock. Turn Buckles of any length made to order at short notice. Buckles without Stub Ends furnished when desired.

MANUFACTURERS' STANDARD LIST OF

BLANK BOLTS.

SQUARE HEADS, WITH FINISHED POINTS.

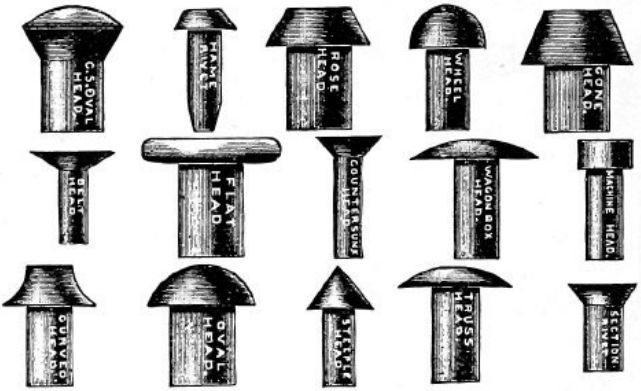
Adopted January 20, 1895, to take effect February 14, 1895.

PRICE PER HUNDRED.

LENGTH.	¼	⁵⁄₁₆	⅜	⁷⁄₁₆	½	⁹⁄₁₆ & ⅝	¾	⅞	1	LENGTH.
1½ Inches.	$1.20	$1.40	$1 60	$2.00	$2.50	$4.00	$5.60	$7.80	$10.40	1½ Inches.
2 "	1.30	1.52	1.74	2.18	2.74	4.36	6.10	8.50	11.30	2 "
2½ "	1.40	1.64	1.88	2.36	2.98	4.72	6.60	9.20	12.20	2½ "
3 "	1.50	1.76	2.02	2.54	3.22	5.08	7.10	9.90	13.10	3 "
3½ "	1.60	1.88	2.16	2.72	3.46	5.44	7.60	10.60	14.00	3½ "
4 "	1.70	2.00	2.30	2.90	3.70	5.80	8.10	11.30	14.90	4 "
4½ "	1.80	2.12	2.44	3.08	3.94	6.16	8.60	12.00	15.80	4½ "
5 "	1.90	2.24	2.58	3.26	4.18	6.52	9.10	12.70	16.70	5 "
5½ "	2.00	2.36	2.72	3.44	4.42	6.88	9.60	13.40	17.60	5½ "
6 "	2.10	2.48	2.86	3.62	4.66	7.24	10.10	14.10	18.50	6 "
6½ "	2.20	2.60	3.00	3.80	4.90	7.60	10.60	14.80	19.40	6½ "
7 "	2.30	2.72	3.14	3.98	5.14	7.96	11.10	15.50	20.30	7 "
7½ "	2.40	2.84	3.28	4.16	5.38	8.32	11.60	16.20	21.20	7½ "
8 "	2.50	2.96	3.42	4.34	5.62	8.68	12.10	16.90	22.10	8 "
9 "	2.70	3.20	3.70	4.70	6.10	9.40	13.10	18.30	23.90	9 "
10 "	2.90	3.44	3.98	5.06	6.58	10.12	14.10	19.70	25.70	10 "
11 "	3.10	3.68	4.26	5.42	7.06	10.84	15.10	21.10	27.50	11 "
12 "	3.30	3.92	4.54	5.78	7.54	11.56	16.10	22.50	29.30	12 "
13 "	3.50	4.16	4.82	6.14	8.02	12.28	17.10	23.90	31.10	13 "
14 "	3.70	4.40	5.10	6.50	8.50	13.00	18.10	25.30	32.90	14 "
15 "	3.90	4.64	5.38	6.86	8.98	13.72	19.10	26.70	34.70	15 "
16 "	4.10	4.88	5.66	7.22	9.46	14.44	20.10	28.10	36.50	16 "
17 "	4.30	5.12	5.94	7.58	9.94	15.16	21.10	29.50	38.30	17 "
18 "	4.50	5.36	6.22	7.94	10.42	15.88	22.10	30.90	40.10	18 "
19 "	4.70	5.60	6.50	8.30	10.90	16.60	23.10	32.30	41.90	19 "
20 "	4.90	5.84	6.78	8.66	11.38	17.32	24.10	33.70	43.70	20 "

The following extras are to be understood as a part of this list: Blank Bolts with Hexagon Heads, Tee Heads Askew Heads, and Eccentric Heads, 10 per cent. extra.

IRON RIVETS.



REVISED LIST. JAN. 8, 1904.

RIVETS, ANY STYLE HEAD.

OLD STANDARD WIRE GAUGE.

Packed as follows: 5 lb. boxes, 100 lbs. in a case. In bulk, 50 lbs., 25 lbs. and 10 lbs. in a box and 100 and 200 lbs. in a keg.

Prices stated are for 10 lb. and 5 lb. boxes.

Size wire.	1 and longer	LENGTH. ⅞	¾	⅝ & ½	15/32	7/16	13/32	⅜	11/32	5/16	9/32	¼	7/32	3/16	5/32	⅛	3/32 inch.
7/16	19	19½	19½	20													Cts. per lb.
⅜	19	19½	19½	20	21												"
11/32	19½	20	20	20½	21	21											"
5/16	19½	20	20	20½	21	22	22	22									"
1	20	20½	20½	21	22	23	23	23	23								"
2	20	20½	20½	21	22	23	23	23	23	24							"
3	20	20½	20½	21	22	23	23	23	23	24	24	24					"
¼	20	20½	20½	21	22	23	23	23	23	24	24	24	25	25			"
4	21	21½	21½	22	23	23	24	24	24	24	24	24	25	25	26		"
5	21	21½	21½	22	23	24	24	24	24	25	26	26	27	27	28	28	29 "
6	21	21½	21½	22	23	24	24	25	25	26	26	27	28	29	29	29	30 "
3/16	21	21½	21½	22	23	24	24	25	25	26	26	27	28	29	30	31	32 "
7	21	21½	22	23	24	24	24	25	25	26	26	27	28	29	30	31	32 "
8	22	22½	22½	23	24	25	25	26	26	27	27	28	29	30	31	32	33 "
9	23	23½	23½	24	25	26	26	27	27	29	29	29	30	31	33	35	36 "
10	24	24½	24½	25	26	27	28	29	31	33	34	34	36	39	41	43	44 "
11	25	25½	25½	26	28	30	32	33	34	36	37	37	39	43	46	48	51 "
12	26	26½	26	27	30	32	34	35	36	38	40	41	42	47	51	56	61 "
13	30	30½	30½	31	33	36	39	40	41	43	45	46	47	51	56	61	66 "
14	32	32½	32½	33	36	41	44	46	51	56	58	61	64	64	66	69	71 "

Rivets made from smaller wire than No. 14, all lengths, list 80 cents per lb.; 3/32 diameter, list price No. 13; 7/32 diameter, list price No. 5; 5/32 diameter, list price No. 8; ⅛ diameter, list price No. 11; 9/32 diameter, list price No. 2.

List Extras—For Shoulder and Pointed Rivets, add 2 cents per lb. to list price for each specialty, excepting Pointed Hame, Caster and Sucker Rod. Intermediate lengths and diameters take list price of nearest smaller size.

BOILER, TANK AND BRIDGE RIVETS.

Cone, Countersunk or Button Head.

BOILER.

⅝ inch and larger by 1¼ inch and longer.... Base
½ " " ⅞ by 1¼ inch and longer extra, ½c
⅝ " " larger by ⅜ inch to 1⅛.... " ¼c

½ inch and ⅞ by ⅞ to 1⅛.....extra, ¼c
⅝ " " larger by ¾ inch and under, " ½c
½ " " ⅞ by ¾ inch and under..... " 1c

TANK AND BRIDGE.

⅛ inch by ½ inch and longer..... .....per lb., $....
⅜ " " ½ " " ....

⅛ inch by ½ inch and longer.....per lb., $....

Packed in 200 lb. kegs.

TINNERS' RIVETS, FLAT HEADS.

Size.....	8	10	12	14 oz.	1	1¼	1½	1¾	2	2½	3 lbs.
Black, per lb.,	$0.42	.38	.35	.33	.30	.27	.26	.25	.24	.24	.23

Size.....	3½	4	5	6	7	8	9	10	12	14	16 lbs.
Black, per lb.,	$0.23	.22	.22	.21	.21	.21	.21	.20	.19½	.19½	.19¼

COOPERS' RIVETS.

Size.....	1	2	3	4	5	6 d.
Per lb...	$0.21	.20½	.20	.20	.20	.20

List Extras. For Tinners' and Coopers' Rivets—for Oval Head and Shoulder or extra length Rivets, add 2c per lb. to list price for each specialty

Net Extras. For Tin or Copper Plated, add 1c per lb. to net price. For Metallic Tinning, add 2½c per lb. to net price.

List Rebates. For 25 and 50 lb. boxes, deduct 2c and for 100 and 200 lb. kegs, deduct 4c per lb. from list price.

TINNERS' RIVETS, FLAT HEAD.

In packages of 1,000. Price per 1,000.

Size.....	8	10	12	14 oz.	1	1¼	1½	1¾	2	2½	3 lbs.
Black.....per M.,	$0.20	.22	.24	.26	.27	.29	.33	.37	.42	.55	.60
Metallic Tinned..... "	.28	.31	.35	.39	.42	.48	.55	.64	.72	.83	1.05
Tin Plated..... "	.24	.27	.30	.33	.35	.39	.45	.51	.58	.75	.84

Size.....	3½	4	5	6	7	8	9	10	12	14	16 lbs
Black.....per M.,	$0.70	.76	.90	1.08	1.26	1.44	1.53	1.75	1.96	2.31	2.64
Metallic Tinned..... "	1.22	1.36	1.65	1.98	2.31	2.64	2.88	3.25	3.76	4.41	5.04
Tin Plated..... "	.98	1.08	1.30	1.56	1.82	2.08	2.25	2.55	2.92	3.43	3.92

List Extras. For Oval or Countersunk Heads, Shoulder and Pointed or extra length Rivets, add 10c per M. to list price for each specialty.

BELT RIVETS AND BURRS.

Old Standard Wire Gauge. Packed as follows: In ½ lb. and 1 lb. boxes; in ¼ lb. boxes, dozened. Each box contains Rivets and Burrs to match in equal number.

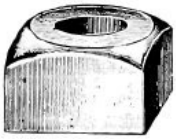
Size Wire.....	7	8	9	10	11	12	13	14
Black. Uniform Lengths.								
1 lb. boxes.....per lb.,	$0.27	.28	.29	.31	.33	.37	.40	.43
½ " ..... "	.31	.32	.33	.35	37	.41	.44	.47
Tin Plated or Copper Plated. Uniform Lengths.								
1 lb. boxes.....per lb.,	$0.35	.36	.37	.39	.41	.45	.48	.51
½ " ..... "	.39	.40	.41	.43	.45	.49	.52	.55
¼ " dozened ..... "	.43	.44	.45	.47	.49	.53	.56	.59
Assorted Lengths. ⅜ to ¾ inches.								
1 lb. boxes.....per lb.,	$0.39	.40	.41	.43	.45	.49	.52	.55
½ " ..... "	.43	.44	.45	.47	.49	.53	.56	.59
¼ " dozened ..... "	.47	.48	.49	.51	.53	.57	.60	.63

The price of Belt Rivets without burrs is taken from the Rivet List, any style head. The price of Burrs without Rivets is taken from the Burr List.

RIVETING BURRS, BLACK.

⅜ to ¼	4	5	6⅛	7	8	9	10	11	12	13	14
$0.36	.37	.38	.42	.43	.44	.45	.47	.50	.60	.70	.80

Regular net extras for Tinned and Plated.



MANUFACTURERS' STANDARD

LIST OF

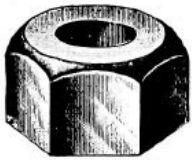
Hot Pressed Square Nuts.

Amended January 17, 1899, to take effect February 1, 1899.

Short Diameter	Thickness	Hole	Size of Bolt	Price per 100 Lbs.	
				Blank	Tapped
1/2	1/4	9/32	1/4	$13 00	$15 00
5/8	5/16	9/32	5/16	11 50	13 00
3/4	3/8	11/32	3/8	10 00	11 10
7/8	7/16	25/64	7/16	9 20	10 10
1	1/2	7/16	1/2	8 70	9 40
1 1/8	9/16	1/2	9/16	8 60	9 20
1 1/4	5/8	9/16	5/8	8 50	9 00
1 1/2	3/4	21/32	3/4	8 40	8 80
1 3/4	7/8	49/64	7/8	8 30	8 70
2	1	7/8	1	8 20	8 60
2 1/4	1 1/8	1 1/32	1 1/8	8 20	8 60
2 1/2	1 1/4	1 5/32	1 1/4	8 30	8 70
2 3/4	1 3/8	1 9/16	1 3/8	8 50	9 00
3	1 1/2	1 5/16	1 1/2	8 70	9 30
3 1/4	1 5/8	1 7/16	1 5/8	8 90	9 60
3 1/2	1 3/4	1 9/16	1 3/4	9 20	9 90
3 3/4	1 7/8	1 11/16	1 7/8	9 40	10 20
4	2	1 13/16	2	9 60	10 50
4	2 1/8	1 7/8	2 1/8	9 70	10 70
4 1/4	2 1/4	2	2 1/4	9 90	11 00
4 1/4	2 3/8	2 1/8	2 3/8	10 10	11 30
4 1/2	2 1/2	2 1/4	2 1/2	10 30	11 60

For less than keg lots (200 lbs.) of a size, add—
20 cents per cwt. for 100 lbs. or over.
50 " " " less than 100 lbs.
For larger sizes see U. S. Standard List.

UNITED STATES STANDARD



LIST OF

Hot Pressed Hexagon Nuts.

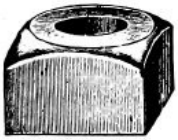
Amended January 17, 1899, to take effect February 1, 1899.

Short Diameter	Thickness	Hole	Size of Bolt	Price per 100 Lbs.	
				Blank	Tapped
1/2	1/4	3/16 scant	1/4	$20 00	$22 50
9/32	5/16	1/4 scant	5/16	18 00	20 00
11/16	3/8	21/64 scant	3/8	14 00	15 60
5/32	7/16	11/32	7/16	13 00	14 30
7/8	1/2	13/32 scant	1/2	11 20	12 20
31/32	9/16	29/64	9/16	11 20	12 10
1 1/16	5/8	33/64	5/8	10 50	11 20
1 1/4	3/4	5/8 scant	3/4	10 00	10 60
1 7/16	7/8	47/64 scant	7/8	9 90	10 50
1 3/8	1	27/32 scant	1	9 70	10 30
1 1/32	1 1/8	15/16 full	1 1/8	9 70	10 30
2	1 1/4	1 1/16 full	1 1/4	9 90	10 50
2 3/16	1 3/8	1 5/32 full	1 3/8	10 00	10 70
2 3/8	1 1/2	1 9/32 full	1 1/2	10 30	11 10
2 9/16	1 5/8	1 25/64 scant	1 5/8	10 50	11 40
2 3/4	1 3/4	1 1/2 scant	1 3/4	10 80	11 70
2 15/16	1 7/8	1 5/8 scant	1 7/8	11 00	12 00
3 1/8	2	1 23/32 scant	2	11 20	12 30
3 5/16	2 1/8	1 27/32 scant	2 1/8	11 70	12 90
3 1/2	2 1/4	1 31/32 scant	2 1/4	11 70	13 00
3 11/16	2 3/8	2 1/16	2 3/8	12 20	13 60
3 7/8	2 1/2	2 1/16	2 1/2	12 40	13 90
4 1/16	2 5/8	2 5/16	2 5/8	13 00	14 60
4 1/4	2 3/4	2 7/16	2 3/4	13 00	14 60
4 1/2	2 7/8	2 9/16	2 7/8	13 50	15 20
4 5/8	3	2 11/16	3	13 50	15 20
5	3 1/4	2 13/16	3 1/4	16 00	17 80
5 3/8	3 1/2	3 1/8	3 1/2	16 00	17 90
5 3/4	3 3/4	3 3/8	3 3/4	17 00	18 90
6 1/8	4	3 9/16	4	17 00	18 90

For less than keg lots (200 lbs.) of a size, add—

20 cents per cwt. for 100 lbs. or over.

50 " " " less than 100 lbs.



UNITED STATES STANDARD

LIST OF

Hot Pressed Square Nuts.

Amended January 17, 1899, to take effect February 1, 1899.

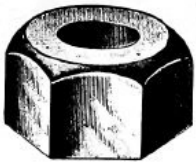
Short Diameter	Thickness	Hole	Size of Bolt	Price per 100 Lbs.	
				Blank	Tapped
½	¼	3/16 scant	¼	$13 00	$15 00
19/32	5/16	¼ scant	5/16	12 00	13 50
1 1/16	⅜	13/64 scant	⅜	10 50	11 60
21/32	7/16	11/32	7/16	10 00	10 90
⅝	½	13/32 scant	½	9 00	9 70
31/32	9/16	29/64	9/16	9 00	9 60
1 1/16	⅝	33/64	⅝	8 70	9 20
1¼	¾	⅝ scant	¾	8 50	8 90
1 7/16	⅞	47/64 scant	⅞	8 40	8 80
1⅛	1	37/32 scant	1	8 20	8 60
1 3/16	1⅛	1 5/16 full	1⅛	8 20	8 60
2	1⅛	1 1/16 full	1¼	8 40	8 80
2 5/16	1¼	1 5/32 full	1⅜	8 50	9 00
2⅜	1½	1 9/32 full	1½	8 80	9 40
2 9/16	1⅝	1 21/32 scant	1⅝	9 00	9 70
2¾	1¾	1½ scant	1¾	9 30	10 00
2 15/16	1⅞	1⅝ scant	1⅞	9 50	10 30
3⅛	2	1 23/32 scant	2	9 70	10 60
3 5/16	2⅛	1 25/32 scant	2⅛	10 00	11 00
3½	2¼	1 31/32 scant	2¼	10 00	11 10
3 11/16	2⅜	2 1/16	2⅜	10 30	11 50
3⅝	2½	2 3/16	2½	10 50	11 80
4 1/16	2⅝	2 7/16	2⅝	11 00	12 40
4¼	2¾	2 7/16	2¾	11 00	12 40
4½	2⅞	2 29/32	2⅞	11 50	13 00
4⅝	3	2 15/16	3	11 50	13 00

For less than keg lots (200 lbs.) of a size, add—

20 cents per cwt. for 100 lbs. or over.

50 " " " less than 100 lbs.

MANUFACTURERS STANDARD



LIST OF

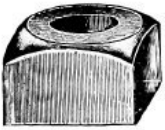
Hot Pressed Hexagon Nuts

Amended January 17, 1899, to take effect February 1, 1899.

Short Diameter	Thickness	Hole	Size of Bolt	Price per 100 Lbs.	
				Blank	Tapped
½	¼	7/32	¼	$20 00	$22 50
⅝	5/16	9/32	5/16	16 00	18 00
¾	⅜	11/32	⅜	13 00	14 60
⅞	7/16	25/64	7/16	11 40	12 70
1	½	7/16	½	10 50	11 50
1⅛	9/16	½	9/16	10 40	11 30
1¼	⅝	9/16	⅝	10 10	10 80
1⅜	¾	21/32	¾	9 90	10 50
1⅝	⅞	25/32	⅞	9 80	10 40
1¾	1	⅞	1	9 70	10 30
2	1¼	31/32	1⅛	9 70	10 30
2⅛	1⅜	1 3/32	1¼	9 80	10 40
2½	1½	1 3/16	1⅜	10 00	10 70
2¾	1⅝	1 5/16	1½	10 20	11 00
3	1¾	1 7/16	1⅝	10 40	11 30
3¼	1⅞	1 9/16	1¾	10 70	11 60
3½	2	1 11/16	1⅞	10 90	11 90
3½	2	1 13/16	2	11 10	12 20
3¾	2⅛	1⅞	2⅛	11 40	12 60
3¾	2¼	2	2¼	11 60	12 90
4	2⅜	2⅛	2⅜	12 00	13 40
4⅛	2½	2¼	2½	12 30	13 80

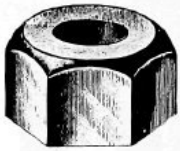
For less than keg lots (200 lbs.) of a size add—
20 cents per cwt. for 100 lbs. or over.
50 " " " less than 100 lbs.

For larger sizes see U. S. Standard List.



Cold Punched, Chamfered,

Trimmed and Reamed



Square and Hexagon Nuts.

United States Standard.

Revised list adopted March 19th, 1901.

Wide	Thick	Hole	Bolt	Square		Hexagon	
				Price per 100 lbs Blank	Price per 100 lbs. Tapped	Price per 100 lbs. Blank	Price per 100 lbs Tapped
1/2	1/4	13/64	1/4	$20 00	$22 00	$27 00	$29 50
19/32	7/16	1/4	5/16	18 00	19 50	24 00	26 00
11/16	3/8	19/64	3/8	14 50	15 60	18 50	20 10
45/64	7/16	11/32	7/16	14 00	14 90	18 00	19 30
7/8	1/2	13/32	1/2	11 30	12 00	14 00	15 00
51/64	9/16	29/64	9/16	11 30	11 90	14 00	14 90
1/16	5/8	33/64	5/8	10 00	10 50	12 50	13 20
1 1/4	3/4	5/8	3/4	9 70	10 10	11 40	12 00
1 1/16	7/8	47/64	7/8	9 60	10 00	11 10	11 70
1 5/8	1	27/32	1	9 40	9 80	10 90	11 50
1 13/16	1 1/8	1 5/16	1 1/8	9 40	9 80	10 90	11 50
2	1 1/4	1 7/16	1 1/4	10 10	10 50	11 50	12 10
2 1/16	1 3/8	1 1/2	1 3/8	10 30	10 80	12 00	12 70
2 1/8	1 1/2	1 21/32	1 1/2	10 70	11 30	12 60	13 40
2 1/16	1 5/8	1 25/64	1 5/8	11 10	11 80	13 20	14 10
2 1/4	1 3/4	1 1/2	1 3/4	11 50	12 20	14 00	14 90
2 5/16	1 7/8	1 5/8	1 7/8	12 00	12 80	14 50	15 50
3 1/8	2	1 23/32	2	12 00	12 90	14 50	15 60
3 1/2	2 1/4	1 1/16	2 1/4	12 50	13 60	15 00	16 30
3 3/4	2 1/2	2 1/16	2 1/2	13 50	14 80	16 00	17 50
4 1/4	2 3/4	2 1/16	2 3/4	14 00	15 40	16 50	18 10
4 5/8	3	2 1/16	3	14 50	16 00	17 00	18 70

The weights of C. P. and Hot Pressed Nuts are the same.

Semi-Finished and Finished

Case Hardened

Hexagon Nuts.

United States Standard

The thread and outside of each **Finished Nut** are made to an accurate gauge, and to the standard adopted by the U. S. Government. First-class in all respects.

The **Semi-Finished Nuts** correspond with the Finished Nuts in all dimensions; they are our rough cold-punched U. S. Standard Nuts, tapped and faced true on the bottom.

For Bolt	Width	Thickness	Number of Threads	Finished Case-Hardened Nuts. Price per 100.	Finished Case-Hardened with Double Chamfer. Price per 100.	Semi-Finished Nuts, Bottom Faced. Price per 100.	Semi-Finished, with Double Chamfer, or Top & Bottom Finish. Price per 100.
¼ in.	½	¼	20	$ 6 00	$ 6 50	$ 2 00	$ 2 50
5/16 "	17/32	5/16	18	7 00	7 50	2 50	2 75
⅜ "	11/16	⅜	16	8 00	8 75	3 25	4 00
7/16 "	25/32	7/16	14	9 00	10 00	3 75	4 75
½ "	⅞	½	13 or (12)	10 00	11 00	4 00	5 00
9/16 "	31/32	9/16	12	12 00	13 00	5 00	6 00
⅝ "	1 1/16	⅝	11	15 00	16 50	6 00	7 50
11/16 "	1 5/32	11/16	11	20 00	22 00	8 50	10 50
¾ "	1¼	¾	10	20 00	22 00	8 50	10 50
⅞ "	1 7/16	⅞	9	25 00	27 50	11 00	13 50
1 "	1⅝	1	8	35 00	38 50	15 00	18 50
1⅛ "	1 13/16	1⅛	7	45 00	49 50	20 00	24 50
1¼ "	2	1¼	7	60 00	66 00	27 00	33 00
1⅜ "	2 1/16	1⅜	6	75 00	82 00	39 00	46 50
1½ "	2¼	1½	6	95 00	105 00	55 00	64 00
1⅝ "	2 9/16	1⅝	5½	125 00	138 00	72 00	83 50
1¾ "	2¾	1¾	5	155 00	170 00	105 00	119 00
1⅞ "	2 15/16	1⅞	5	210 00	230 00	130 00	148 00
2 "	3¼	2	4½	275 00	300 00	160 00	182 00
2¼ "	3½	2¼	4½	500 00	550 00	235 00	265 00
2½ "	3¾	2½	4	850 00	950 00	375 00	415 00
2¾ "	4¼	2¾	4	1,200 00	1,350 00	500 00	560 00
3 "	4⅝	3	3½	1,800 00	2,000 00	800 00	900 00

In lots of 100 and more; small lots at discretion.

Finished Nuts, not Case-Hardened, at regular prices; Polished, not Case-Hardened, at 10 per cent. advance.

Nuts Polished after Case-Hardening, 30 per cent. additional.

Case-Hardened Semi-Finished Nuts, 20 per cent. additional.

Semi-Finished Square Nuts made to order.

WROUGHT WASHERS.

Revised October 9, 1895, to take effect October 10, 1895.

Diameter	Size of Hole	Thickness Wire Gauge	Size of Bolt	Price per Pound	Average Number in 100 lbs
9/16	1/4	No. 18	3/16	$14 00	44,075
5/8	5/16	" 16	1/4	12 20	13,845
7/8	3/8	" 16	5/16	11 40	11,220
1	7/16	" 14	3/8	10 50	6,573
1 1/4	1/2	" 14	7/16	9 70	4,261
1 3/8	9/16	" 12	1/2	9 20	2,683
1 1/2	5/8	" 12	9/16	9 10	2,249
1 5/8	11/16	" 10	5/8	9 00	1,315
2	13/16	" 10	3/4	8 80	1,013
2 1/4	15/16	" 9	7/8	8 80	858
2 1/2	1 1/16	" 9	1	8 80	617
2 3/4	1 1/4	" 9	1 1/8	8 80	516
3	1 3/8	" 9	1 1/4	9 00	403
3 1/4	1 1/2	" 8	1 3/8	9 00	320
3 1/2	1 5/8	" 8	1 1/2	9 20	278
3 3/4	1 3/4	" 8	1 5/8	9 20	247
4	1 7/8	" 8	1 3/4	9 50	224
4 1/4	2	" 8	1 7/8	9 50	200
4 1/2	2 1/8	" 8	2	9 50	180

For less than keg lots (200 lbs) of a size, add—

20 cents per cwt for 100 lbs. or over.
50 " " less than 100 lbs

Odd or Special Sizes of Washers made to order.

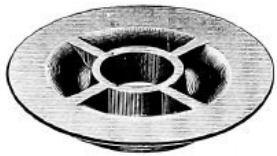
Prices quoted on application.

MALLEABLE IRON WASHERS.

Weight
one-third of cast iron.

400 per cent. stronger.

(PATENT PENDING.)



Hole, size of bolt, inches	½	⅝	¾	⅞	1	1⅛	1¼	1½	1¾	2
Diameter, inches.....	2½	2¾	3	3½	4	4½	5	6	6	6
Thickness, "	5/16	7/16	½	9/16	9/16	9/16	¾	¾	¾	1
Weight, ounces.....	2⅓	3⅓	5⅓	8	11	14	24	30	33	67

Comparative Weight of Old Style Common Washers.

Ounces.....	7	10½	16	24	32	42	72	92	99	202

Standard diameter same as cast washers; thickness about one-half of cast washers. Save 66⅔ per cent. weight to structure. Save one-half to one inch in length of bolts. Save 66⅔ per cent. of all freight rates.

WEIGHTS AND SIZES OF
Cast Washers.

Weight Per 100.

Size of Bolt or Rod	⅜ in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.
Dimensions	1½ x 5/16	2 x ⅜	2½ x ½	3 x ⅝	3½ x ¾	4 x ⅝
Weight	9½ lbs.	21 lbs.	43 lbs.	70 lbs.	113 lbs.	175 lbs.
Size of Bolt or Rod	1⅛ in.	1¼ in.	1⅜ in.	1½ in.	1¾ in.	2 in.
Dimensions	4½ x 1	5 x 1⅛	5½ x 1¼	6 x 1⅜	7 x 1½	7½ x 1⅝
Weight	256 lbs.	332 lbs.	455 lbs.	610 lbs.	865 lbs.	1,115 lbs.

Prices quoted on application.

STEEL WIRE NAILS.

List Adopted December 1, 1896.

COMMON, Fence, Shingle, Tobacco, Flooring, and Common Brads.

	ADVANCES.
20d to 60d	**Base**
10d to 16d	**$0 05**
8d and 9d	**10**
6d and 7d	**20**
4d and 5d	**30**
3d	**45**
2d	**70**

Barbed Common and Barbed Car Nails

15 cents advance over common

Casing and Smooth Box Nails

10d and larger	$0 15
8d and 9d	25
6d and 7d	35
4d and 5d	50
3d	70
2d	1 00

Barbed Box, 15 cents advance over smooth nails.

Smooth Finishing Nails

10d and larger	$0 25
8d and 9d	35
6d and 7d	45
4d and 5d	65
3d	85
2d	1 15

Lining Nails

¾-inch	$1 20
⅞-inch	1 00
1 -inch	80

Slating Nails

2d	$0 80
3d	60
4d	40
5d	40
6d	30

Fine Nails

2d	$1 00
3d, 1⅛x15	50
3d, extra fine, 1⅛x16	65

Barrel Nails

	ADVANCES
¾-inch	$1 00
⅞-inch	85
1 -inch	70
1⅛-inch	60
1¼-inch	50
1⅜-inch	40
1½-inch	30

Barbed Roofing Nails

¾-inch	$0 75
⅞-inch	65
1 -inch	60
1⅛-inch	60
1¼-inch	55
1½ and 1¾-inch	45
2 -inch	35

Clinch Nails (Annealed or Bright)

2d	$1 05
3d	85
4d and 5d	65
6d and 7d	55
8d and 9d	45
10d to 20d	35

Hinge Nails (Annealed or Bright)

4d	$0 80
6d	70
8d	60
10d and larger	50

Boat Nails

25 cents extra over hinge.

Spikes

All sizes to 9-inch	$0 10
10-inch and larger	25

Barbed Dowel Pins

⅝-inch	$1 25
¾-inch	1 00
⅞-inch	85
1 -inch	70
1⅛-inch	60
1¼-inch	60
1⅜-inch	60
1½-inch	60

NOTE—3d Extra Fine Nail was added to the list Sept. 15, 1898.
Annealed Nails (except Clinch and Hinge) 15c extra.
Blued Nails 25c extra.

MISCELLANEOUS WIRE NAILS

Applying to all Nails except Standard Nails in Kegs. Prices stated are per pound for 1, 5 and 10-pound packages.

Size	No.	Price
¼-inch,	No. 19	$1 00
	" 20	1 25
	" 21	1 55
	" 22	1 90
⅜-inch,	" 18	80
	" 19	90
	" 20	1 00
	" 21	1 25
	" 22	1 55
½-inch,	" 14, 15, 16	55
	" 17	60
	" 18	65
	" 19	75
	" 20	85
	" 21	1 00
	" 22	1 25
⅝-inch,	" 12, 13, 14	43
	" 15	45
	" 16	50
	" 17	52
	" 18	58
	" 19	65
	" 20	75
	" 21	85
	" 22	1 10
¾-inch,	" 10, 11, 12	36
	" 13	38
	" 14	38
	" 15	42
	" 16	43
	" 17	46
	" 18	52
	" 19	60
	" 20	70
	" 21	85
⅞-inch,	" 8, 9	33

Size	No.	Price
⅞-inch,	No 10, 11, 12	$0 33
	" 13	34
	" 14	35
	" 15	36
	" 16	39
	" 17	43
	" 18	45
	" 19	56
	" 20	67
1-inch,	Nos. 7 to 12	30
	No. 13	31
	" 14	32
	" 15	33
	" 16	36
	" 17	40
	" 18	43
	" 19	53
	" 20	64
1⅛-inch,	Nos. 7 to 12	30
	No. 13	31
	" 14	32
	" 15	32
	" 16	35
	" 17	40
	" 18	43
	" 19	53
1¼ and 1⅜ inch,	Nos. 6 to 12	29
	No. 13	30
	" 14	31
	" 15	32
	" 16	34
	" 17	39
1½ and 1⅝-inch,	Nos. 4 to 13	29
	No. 14	30
	" 15	31
	" 16	33
	" 17	38

Size	No.	Price
1¾-inch,	Nos. 4 to 13	$0 28
	No. 14	29
	" 15	30
	" 16	32
	" 17	38
2-inch,	Nos. 3 to 10	27
	No. 11	28
	" 12	28
	" 13	28
	" 14	29
	" 15	30
	" 16	35
2¼-inch,	Nos. 3 to 10	27
	No. 11	28
	" 12	28
	" 13	28
	" 14	29
2½-inch,	Nos. 3 to 10	26
	No. 11	27
	" 12	27
	" 13	28
2¾-inch,	Nos. 3 to 10	26
	No. 11	27
	" 12	27
3-inch,	Nos. 3 to 10	25
	No. 11	26
	" 12	27
3¼-inch,	Nos. 3 to 10	25
	No. 11	26
	" 12	27
3½-inch,	Nos. 3 to 10	25
	No. 11	26
4-inch,	Nos. 3 to 10	25
	No. 11	26

LIST EXTRAS--SUBJECT TO DISCOUNT.

Add to list 4 cents per pound for ½-pound paper boxes.
" 8 " " for ¼-pound " "
" 2 " " for barbing.
" 2 " " for annealing.
" 2 cents for Cone Heads, Special Heads and Headless.
" 2 cents for Needle Points and Special Points.

For Nails combining several specialties, add as above for each.
For sizes not appearing on the list, use the list prices for the desired gauge in the nearest shorter length.
Nails heavier than listed, at special net prices, according to quantity.
Tinned or Galvanized Nails at special prices.

REBATES FROM LIST PRICES.

Rebate for 25 and 50-pound boxes, 1 cent per pound.
Rebate for Nails in 100-pound kegs, 2 cents per pound.

MELLOR BOX OPENER, NAIL PULLER AND HAMMER.

Drop forged, made of high-grade steel, tempered and polished. Especially adapted to opening boxes, crates and barrels. It saves the lids. Draws the nails straight.

Made in two sizes:

No. 1.	Length 14 inches, weight 1½ lbs.	$1 00
No. 2.	" 10 " " 14 oz.	85

WESTMORELAND TOOL STEEL.

IN recent years, the new avenues of commerce that were opened have increased the demands for **Special Steels,** which are required to perform extra duties, and where care and close study must be applied to meet the specifications.

THE Steels we furnish are the best of their respective kinds known to the trade. The special care exercised in the selection of raw materials, and the constant attention given towards the workmanship, insure the attainment of the highest standard in Westmoreland Steels.

Arrow Grade Is intended for general use and for what is known as the "standard" quality of Tool Steel. It is made with great care and from good stock, so as to be suitable for all kinds of tools, such as hammers, chisels, rock drills, blacksmiths' tools, etc.

Base.....per lb., $.....

Extra Arrow A much better grade of Tool Steel, specially adapted for rock drills, edge tools, channeling tools, granite and marble quarry tools, axes, track chisels, etc.

Base.....per lb., $.....

Arrow Die Steel This quality is specially designed for die blocks for drop forgings and for forming and cutting dies, shear blades, taps, drills, milling cutters, etc.

Base.....per lb., $.....

WESTMORELAND TOOL STEEL.

Dragon Special

This is particularly well suited for fine lathe and planer tools and other kinds of fine machine tools, also punches, shear blades, milling cutters, taps, drills, and where severe duty is required. We use particular care in the selection of the raw material that enters into this grade of Steel, so that it will be particularly tough and suited for the needs above mentioned.

Base.....per lb., $.....

Dragon Extra Special

Is an extra fine grade of Tempering Steel of extra special quality, and particular care is exercised in its manufacture. It is, therefore, that we can specially recommend it for fine lathe and planer tools and other finishing tools, cutters, reamers, fine dies, etc., and where tools are to be made for special purposes and of great cost.

Base.....per lb., $.....

Dragon Double Extra Special

We have designed this superior quality of Tool Steel to meet the demands for exceptional fine work and exceptional fine tools. Fine jewelers' tools, surgical instruments, engraving and threading dies, etc., should be made of this quality.

Base.....per lb., $.....

"Cornell Keen" Self-Hardening Steel

This grade of Tool Steel is made especially for use in foundries and machine shops for making heavy cuts in cast iron and steel. It is also adapted for making nail dies and boring tools.

Base.....per lb., $.....

"Trinity True" High-speed Steel

Is especially designed for performing extra heavy cutting, operating at highest possible speed. This stock is particularly suited for machining locomotive tires, axles, steel bars, malleable irons, etc., and unexcelled for all kinds of hot work.

Base.....per lb., $.....

STANDARD CLASSIFICATION OF TOOL STEEL.

OIL WELL BIT AND JAR STEEL.

For Drilling Oil, Gas and Artesian Wells.

MINING DRILL STEEL.

Octagon.....per lb., $.....
X shape.....

IMPLEMENT STEEL.

Ice plow steel, all sizes.....per lb., $.....
Pike and cant hook, all sizes.....
Pick and mattock, all sizes.....
Granite and coal wedge, all sizes.....

ANNEALED STEEL.

For dies, cutters, reamers, taps, and other purposes.

Per lb., extra.....5c

TOOL STEEL CLASSIFICATION.

All dimensions inclusive.

ROUND, SQUARE, AND OCTAGON.

⅜ to 2 inches.....Base

Per lb.	Per lb.
2⅛ to 3 inches, extra, $0.01	7/16 to ½ inch....extra, $0.00½
3⅛ to 4 " " .01½	9/16 to ⅝ " " .01
4⅛ to 5 " " .02	⅝ and 11/16 inch.. " .02
5⅛ to 6 " " .02½	¾ " ⅞ " " .03
6⅛ to 7 " " .03	7/8 inch..... " .05
7⅛ to 8 " " .03½	⅞ " ..... " .10
	7/8 " ..... " .18

FLAT.

⅜ to 2 inches thick by 7/16 to 2 inches wide.....Base

Per lb.	Per lb.
⅛x 7/16 inch.....extra, $0.20	7/16x7⅛ to 8 in..extra, $0.02
⅛x ¾ " " ..... " .15	¼x 9/16 to ⅝ in.. " .02
⅛x 7/8 " " ..... " .08	¼x 11/16 to ¾ in.. " .01½
⅛x ⅞ " ..... " .04	¼x 1⅛ to 2 in.. " .01½
⅛x 7/8 to ½ in., " .03	¼x2⅛ to 7 in.. " .01
⅛x 7/8 to 7 in., " .02	¼x7⅛ to 8 in.. " .02
⅛x7⅛ to 8 in., " .03	7/16x ⅜ to ⅝ in.. " .01½
3/16x ¾ inch..... " .05	7/16x 11/16 to 8 in.. " .01
3/16x 7/8 " ..... " .04	7/16x 7/8 to 8 in.. " .01
3/16x ⅞ " ..... " .03	⅜x ⅝ to 8 in.. " .01
3/16x ⅞ to ⅝ in., " .02	⅜x ¾ to 8 in.. " .01
3/16x 1⅛ to 2 in., " .01½	⅜x 7/8 to 8 in.. " .01
⅜x2⅛ to 7 in., " .01	

Per lb.	Per lb.
⅛ to 2 inches by ⅛ to 2 inches.....extra, $.....	
⅛ to 2 " by 2⅛ to 7 " ..... " .01	
⅛ to 1¾ " by 7⅛ to 8 " ..... " .01	
1⅞ to 2 " by 7⅛ to 8 " ..... " .01½	
2⅛ to 3 " by 2⅛ to 5 " ..... " .01	
2⅛ to 3 " by 5⅛ to 8 " ..... " .01½	
3⅛ to 4 " by 3⅛ to 6 " ..... " .01½	
3⅛ to 4 " by 6⅛ to 8 " ..... " .02	
4⅛ to 5 " by 4⅛ to 7 " ..... " .02	
4⅛ to 5 " by 7⅛ to 8 " ..... " .02½	
5⅛ to 6 " by 5⅛ to 8 " ..... " .02½	
6⅛ to 7 " by 6⅛ to 7 " ..... " .03	
6⅛ to 8 " by 7⅛ to 8 " ..... " .03½	

Unenumerated sizes at price of the next larger on the list.

CUTTING TO SPECIFIED SINGLE AND MULTIPLE LENGTHS.

24 inches or over.....per lb., ½c
18 to 24 inches..... " 1c
12 to 18 " ..... " 1½c
6 to 12 " ..... " 2c

Less than 6 inches, contract.

WELDING STEEL.

Welding steel, all sizes.....per lb., $.....
Facing steel, all sizes..... " .....
Vise-jaw steel..... " .....

SPRING STEEL.

Round and square, base sizes.....per lb., $.....
Flat, base sizes..... " .....

SPRING CLASSIFICATION.

ROUND AND SQUARE.

⅝ to 1½ inches.....Base

Per lb.	Per lb.
7/16 and ½ inch.....extra, ½c	¾ inch.....extra, 1½c
9/16 " ⅝ " ..... " ½c	7/8 " ..... " 3c
⅞ inch..... " 1c	

Cutting to lengths 24 inches and over, ¼c per lb.; under 24 inches, special price.

FLAT.

1¼ to 4 inches by No. 4 gauge to ½ inch inclusive .....Base

Per lb.	Per lb.
1 and 1¼ in. by No. 1 to 4 gauge.....extra, per lb., ½c	
1 to 3 in. by No. 5 to 7 " ..... " " ½c	
¼ and 1⅛ in. by No. 1 to 7 " ..... " " ½c	
⅜ to 1⅛ in. by No. 1 to 7 " ..... " " 1c	
¾ to 3 in. by No. 8 to 10 " ..... " " 1c	
¾ to 3 in. by No. 11 to 16 " ..... " " 1½c	
¾ to 3 in. by No. 17 to 19 " ..... " " 2½c	
⅜ to 5/16 in. by No. 10 to 16 " ..... " " 4c	
⅜ to 7/16 in. by No. 17 to 19 " ..... " " 5c	

Thinner than No. 19 gauge, refer to sheet list.

MACHINERY STEEL.

Base sizes.....per lb., $.....

ROLLED CLASSIFICATION.

ROUND, SQUARE, HEXAGON, AND OCTAGON.

¼ to 3 inches diameter.....Base
⅝ to 1⅛ inch diameter.....extra per lb., ½c
⅜ to 7/16 " " ..... " " ½c
7/16 to ½ " " ..... " " ½c
⅝ to ¾ " " ..... " " ½c
¾ to ⅞ " " ..... " " ½c
⅞ inch diameter..... " " 1½c
1 " ..... " " 6c

FLAT.

⅛ to 2 inches thick by 7/16 to 2 inches wide.....Base

The extras for flat are one-half those of the Flat Tool Steel Classification.

HAMMERED CLASSIFICATION.

3½ to 4 inches diameter.....extra, per lb., 1c
4½ to 6 " ..... " 1½c

All hammered steel not enumerated under the Hammered Classification, ½c per lb. extra throughout the list.

CUTTING TO SPECIFIED SINGLE AND MULTIPLE LENGTHS.

Per lb.	Per lb.
24 inches or over ..... ½c	12 to 18 inches.....1½c
18 to 24 inches.....1c	6 to 12 " 2c

Less than 6 inches, contract.

STANDARD CLASSIFICATION OF MILD OR SOFT STEEL.

Adopted November 10, 1899.

OPEN HEARTH AND BESSEMER.

ROUNDS AND SQUARES.

Squares up to 4 inches only.

	Per 100 lbs.
3/16 to 3 inches	Rates
5/16 to 1 1/8 inch	extra, $0.10
1/2 to 1 7/8 "	" .20
1 7/8 inch	" .40
3/8 "	" .50
1 5/8 "	" .60
1/4 and 2 3/8 inch	" .70
2 7/8 inch	" 1.00
1 7/8 "	" 2.00
3 1/16 to 3 1/2 inches	" .30
3 1/16 to 4 "	" .50
4 1/16 to 4 1/2 "	" .60
4 1/16 to 5 "	" .80
5 1/16 to 5 1/2 "	" 1.00
5 5/16 to 6 "	" 1.50
6 1/16 to 6 1/2 "	" 2.00
6 5/16 to 7 1/4 "	" 2.50

For intermediate sizes, the next highest extra to be charged.

FLAT BARS AND HEAVY BANDS.

	Per 100 lbs.
1 to 6 inches by 1/4 to 1 inch	Rates
1 to 6 " by 1/4 and 5/16 "	extra, $0.20
1 1/16 to 1 1/8 inch by 3/8 to 3/4 "	" .40
1 1/16 to 1 1/8 " by 1/4 and 1 7/16 "	" .50
1 5/16 and 3/8 " by 3/8 to 1/2 "	" .50
1 1/16 " 5/8 " by 1/4 and 1 1/16 "	" .70
1/2 inch by 3/8 and 1 7/16 inch	" .90
1/2 " by 1/4 " 1 7/16 "	" 1.10
1 7/16 " by 3/8 inch	" 1.00
1 7/16 " by 1/4 and 1 7/16 inch	" 1.20
3/8 " by 1/4 " 1 1/16 "	" 1.50
1 1/16 to 6 inches by 1 1/16 to 1 1/16 inches	" .10
1 1/16 to 6 " by 1 1/4 to 1 1/2 "	" .20
1 3/4 to 6 " by 1 5/8 to 2 3/4 "	" .30
3 1/16 to 6 " by 3 to 4 "	" .40

For intermediate sizes, the next highest extra to be charged.

LIGHT BARS AND BANDS.

	Per 100 lbs.
1 1/2 to 6 in. by Nos. 7, 8, 9 and 1 1/16 in.	extra, $0.40
1 1/2 to 6 in. by Nos. 10, 11, 12 and 1/8 in.	" .60
1 to 1 7/16 in. by Nos. 7, 8, 9 and 1 5/16 in.	" .50
1 to 1 7/16 in. by Nos. 10, 11, 12 and 1/8 in.	" .70
1 1/16 to 1 1/8 in. by Nos. 7, 8, 9 and 1 5/16 in.	" .70
1 1/16 and 1 1/8 in. by Nos. 10, 11, 12 and 1/8 in.	" .80
1 1/16 " 3/4 in. by Nos. 7, 8, 9 and 1 1/16 in.	" 1.00
1 1/16 " 3/4 in. by Nos. 10, 11, 12 and 1/8 in.	" 1.20
1 5/16 " 1/8 in. by Nos. 7, 8, 9 and 1 1/16 in.	" 1.20
1 1/16 " 1/8 in. by Nos. 10, 11, 12 and 1/8 in.	" 1.30
1/2 inch by Nos. 7, 8, 9 and 1 5/16 inch,	" 1.30
1/2 " by Nos. 10, 11, 12 " 1/8 "	" 1.50
1 1/16 " by Nos. 7, 8, 9 " 1 1/16 "	" 1.80
1 1/16 " by Nos. 10, 11, 12 " 1/8 "	" 2.10
3/8 " by Nos. 7, 8, 9 " 1 5/16 "	" 1.90
3/8 " by Nos. 10, 11, 12 " 1/8 "	" 2.40

OVALS.

	Per 100 lbs.
5/16 to 1 1/4 inches	extra, $0.40
3/4 to 1 1/8 inch	" .50
5/8 to 1 1/8 "	" .60
1/2 to 1 5/16 "	" .80
3/8 to 1 1/16 "	" 1.00

For intermediate sizes, the next highest extra to be charged.

HALF OVALS AND HALF ROUNDS.

	Per 100 lbs.
5/16 to 2 inches	extra, $0.50
3/4 to 1 1/8 inch	" .60
5/8 to 1 1/8 "	" .70
1/2 to 1 5/16 "	" .90
3/8 to 1 1/16 "	" 1.10

For intermediate sizes, the next highest extra to be charged.

All sizes not enumerated to be subject to special arrangement.

Angles from 3/4 x 3/4 up to 6x6 inches. Prices quoted on application.

HORSE SHOE STEEL.

	Per 100 lbs.
5/16 to 1 1/2 by 1/16 to 7/8 inch	extra, $1.00

WAGON BOX STEEL.

	Per 100 lbs.
7/8 inch, Nos. 13 and 14	extra, $0.90
7/8 " Nos. 11 " 12	" .90
3/4 " Nos. 13 " 14	" 1.10
1/4 " Nos. 11 " 12	" 1.00
5/8 " Nos. 13 " 14	" 1.30
5/8 " Nos. 11 " 12	" 1.30

ANGLE STEEL.

	Per 100 lbs.
1 1/2 x 1 1/16 inch and larger	Rates
1 to 1 1/4 inch by 1/16 inch and heavier	extra, $0.05
7/8 x 1 1/16 inch	" .10
3/4 x 1 1/16 "	" .15
Angles, 1/8 inch thick	" .05
Cutting to exact length	" .05

T STEEL.

All sizes ..... per lb.

Z STEEL.

All sizes ..... per lb.

EXTRAS FOR CUTTING ORDINARY BARS TO SPECIFIED LENGTHS.

Hot sawing or shearing, 24 inch and longer bars ..... per lb., 1/10c

Hot sawing or shearing, 12 to 24 inches, " 1/10c

" shearing, 6 to 12 inches ..... " 1/10c

Machine cutting, specified lengths, above 24 inches ..... per lb., 1/10c

Machine cutting, specified lengths, 12 to 24 inches ..... per lb., 1/10c

Machine cutting, to specified lengths, less than 12 inches, according to contract, but not less than 1/10c on each size.

No charge for shear cutting to multiple lengths of 12 inches and under.

Machine straightening and cutting ..... per lb., 1/10c

" " alone for ordinary sizes, per lb. 1/10c

Rounds up to 5 inch diameter, over 24 feet long, and larger than 5 inch diameter, over 18 feet long, will be charged at an extra price.

All sizes not enumerated subject to special arrangement.

TANK STEEL.

¼ inch to ⅝ inch thick.....Rates

SOFT SHEET STEEL.

No. 8 and $\frac{3}{16}$	extra,	$0.10
No. 10 and 12	"	.20
No. 14	"	.30
No. 16	"	.50
No. 18 to 21	"	.60
No. 22 to 24	"	.70
No. 25 to 26	"	.80
No. 27	"	.90

CORRUGATED STEEL.

Corrugated Sheet Steel, Nos. 22 to 24..per lb., $
" " " Nos. 25 and 26, "
Galvanized Corrugated, Nos. 21 to 24.. "

Sheets 30 inches wide when corrugated with 1⅜ inch corrugation will lay 24 inches to weather. Usual stock length, 96 inches.

ICE SLIDE STEEL.

$1\frac{1}{2}x\frac{5}{16}x\frac{5}{32}$..... extra, $1.00

SLED SHOE STEEL.

Concave and Convex.

$\frac{5}{16}$x2, 2¼, 2½ and 3.
$\frac{3}{8}$x2, 2¼, 2½, 3, 3¼, 3½ and 4.
$\frac{1}{2}$x3, 3¼, 3½ and 4.
½x3, 3¼, 3½ and 4.

Flat Sled Shoe Steel.....per lb.,

NORWAY AND SWEDISH IRON CLASSIFICATION.

ROUNDS AND SQUARES.

1 to 1⅞ inches		Rates
2 to 2⅜ "	extra,	$\frac{1}{16}$c
2¼ to 3¼ "	"	$\frac{1}{8}$c
3½ to 4 "	"	½c
¼ to $\frac{7}{16}$ inch	"	$\frac{1}{16}$c
$\frac{9}{16}$ to ⅝ "	"	$\frac{1}{8}$c
$\frac{11}{16}$ to ½ "	"	$\frac{1}{16}$c
⅜ inch	"	$\frac{1}{16}$c
$\frac{13}{16}$ "	"	$\frac{1}{16}$c
¼ "	"	1c
$\frac{15}{16}$ "	"	3c

FLATS.

1½ to 4 by ⅜ to 1 inch thick		Rates
4¼ to 6 by ⅜ to 1 " "	extra,	$\frac{1}{16}$c
1¾ to 6 by 1⅛ to 1½ inches thick	"	$\frac{1}{16}$c
2⅛ to 6 by 2 inches thick	"	½c
1¼ and 1⅜ by ⅜ to 1 inch thick	"	$\frac{1}{16}$c
1 and 1⅛ by ⅜ to ⅞ " "	"	$\frac{1}{16}$c
½, ⅝, ¾ and ⅞ by ⅜ to ⅝ inch thick	"	$\frac{1}{16}$c
1½ to 6 by ¼ and $\frac{1}{16}$ inch thick	"	$\frac{1}{16}$c
1 to 1⅜ by ¼ and $\frac{1}{16}$ " "	"	$\frac{1}{16}$c
¾ and ⅞ by ¼ and $\frac{1}{16}$ inch thick	"	½c
½ and ⅝ by ¼ and $\frac{1}{16}$ " "	"	1c
to 2 by $\frac{1}{16}$ inch thick	"	½c
¼ and ⅞ by $\frac{1}{16}$ inch thick	"	$\frac{1}{16}$c
½ and ⅝ by $\frac{1}{16}$ " "	"	$1\frac{1}{16}$c

NAIL RODS.

⅛ by $\frac{5}{16}$, 25 lb. and 50 lb. bundles.....extra, 1½c

NATIONAL IRON CLASSIFICATION

Adopted December 3, 1895.

ROUNDS AND SQUARES.

		Per 100 lbs.
1 to 1⅞ inches		Base
2 to 2⅞ "	extra,	$0.20
3 to 3½ "	"	.50
3⅝ to 4 "	"	.80
4⅛ to 4½ "	"	1.00
4⅝ to 5 "	"	1.30
5⅛ to 6 "	"	1.80
6⅛ to 6½ "	"	2.20
6⅝ to 7¼ "	"	2.50
¼ to ⅞ inch	"	.10
⅜ to $\frac{15}{16}$ "	"	.20
½ to $\frac{7}{8}$ "	"	.30
$\frac{7}{16}$ to $\frac{13}{16}$ "	"	.40
⅝ to $\frac{11}{16}$ "	"	.50
$\frac{9}{16}$ to $\frac{11}{16}$ "	"	.70
¼ to $\frac{9}{32}$ "	"	.90
$\frac{1}{16}$ inch	"	1.40
$\frac{3}{16}$ "	"	2.50

FLATS.

		Per 100 lbs.
1½ to 4 by ⅜ to 1 inch		Base
4¼ to 6 by ⅜ to 1 "	extra,	$0.10
4¼ to 6 by $1\frac{1}{16}$ to 1½ "	"	.40
6¼ to 8 by ⅜ to 1 "	"	.60
6¼ to 8 by $1\frac{1}{16}$ to 1½ "	"	.60
8¼ to 10 by ⅜ to 1 "	"	.80
1⅜ to 4 by 1⅛ to 1½ "	"	.30
2 to 4 by 1⅝ to 2 "	"	.50
5¼ to 6 by 1⅝ to 2 "	"	.60
6¼ to 8 by 1⅝ to 2 "	"	.80
8¼ to 10 by $1\frac{1}{16}$ to 1½ "	"	.90
8¼ to 10 by 1⅝ to 2 "	"	1.00
2 to 4 by 2⅛ to 3 "	"	.60
4¼ to 6 by 2⅛ to 3 "	"	.80
6¼ to 8 by 2⅛ to 3 "	"	1.00
1⅝ to 1⅞ by ⅜ to 1 "	"	.10
1 to $1\frac{1}{16}$ by ⅜ to ⅞ "	"	.20
¼ to $\frac{11}{16}$ by ⅜ to ¼ "	"	.40
⅜ to $\frac{11}{16}$ by ⅜ to ⅜ "	"	.50
½ to $1\frac{9}{16}$ by ⅜ to ½ "	"	.90

OVAL IRON.

		Per 100 lbs.
⅜ to 1½ inches	extra,	$0.40
¼ to $\frac{13}{16}$ "	"	.50
⅜ to $\frac{11}{16}$ "	"	.60
½ to $\frac{7}{8}$ "	"	.80
⅜ to ⅞ "	"	1.10
½ to ⅞x$\frac{9}{16}$ inch	"	1.00
⅜ to $\frac{11}{16}$x⅞ "	"	1.20

HALF OVAL AND HALF ROUND

		Per 100 lbs.
2¼ to 3 inches	extra,	$0.60
⅞ to 2 "	"	.50
¾ to $\frac{13}{16}$ "	"	.70
⅝ to $\frac{11}{16}$ "	"	.90
½ to $\frac{9}{16}$ "	"	1.20
⅜ to $\frac{7}{16}$ "	"	2.50
$\frac{5}{8}$ inch	"	3.50
¼ "	"	4.50

Half oval, less than ¼ their width in thickness, extra price.

STEEL HOOPS.

Width in inches.	English Standard Gauge.	Extras.
1⅞ to 3	Nos. 13, 14, 15 and 16	10c. per 100 lbs
1⅞ to 2	" 17, 18 and 19	.15 " "
1⅛ to 2	" 20	.20 " "
1⅛ to 2	" 21	.25 " "
1⅛ to 1½	" 22	.35 " "
1⅛ to 1½	" 13, 14 and 15	.15 " "
1⅛ to 1½	" 16, 17 and 18	.20 " "
1⅛ to 1½	" 19 and 20	.25 " "
1⅛ to 1½	" 21	.30 " "
1⅛ to 1½	" 22	.40 " "
¾ and 1	" 13, 14 and 15	.20 " "
¾ and 1	" 16, 17 and 18	.25 " "
¾ and 1	" 19 and 20	.30 " "
¾ and 1	" 21	.35 " "
¾ and 1	" 22	.45 " "
¾ and 1	" 23	.55 " "
¾ and 1	" 24	.65 " "
	" 13, 14 and 15	.30 " "
	" 16, 17 and 18	.35 " "
	" 19 and 20	.40 " "
	" 21	.45 " "
	" 22	.55 " "
	" 23	.65 " "
	" 24	.75 " "
½ and ¾	" 13, 14 and 15	.40 " "
½ and ¾	" 16, 17 and 18	.45 " "
½ and ¾	" 19 and 20	.50 " "
½ and ¾	" 21	.55 " "
½ and ¾	" 22	.60 " "
½ and ¾	" 23	.70 " "
½ and ¾	" 24	.80 " "
½ and ¾	" 25	.90 " "
½ and ¾	" 26	1.00 " "
½	" 13, 14 and 15	.45 " "
½	" 16, 17 and 18	.50 " "
½	" 19 and 20	.60 " "
½	" 21	.70 " "
½	" 22	.80 " "
½	" 23	.90 " "
½	" 24	1.00 " "
½	" 25	1.10 " "
½	" 26	1.20 " "
½	" 13, 14 and 15	.50 " "
½	" 16, 17 and 18	.55 " "

Width in inches	English Standard Gauge.	Extras.
⅜	Nos. 19 and 20	.65c. per 100 lbs
⅜	" 21	.75 " "
⅜	" 22	.85 " "
⅜	" 23	.95 " "
⅜	" 24	1.05 " "
⅜	" 25	1.15 " "
⅜	" 26	1.25 " "
5/16	" 13, 14 and 15	.55 " "
5/16	" 16, 17 and 18	.60 " "
5/16	" 19 and 20	.70 " "
5/16	" 21	.80 " "
5/16	" 22	.90 " "
5/16	" 23	1.00 " "
5/16	" 24	1.10 " "
5/16	" 25	1.20 " "
5/16	" 26	1.30 " "
¼	" 13, 14 and 15	.65 " "
¼	" 16, 17 and 18	.70 " "
¼	" 19 and 20	.80 " "
¼	" 21	.90 " "
¼	" 22	1.00 " "
¼	" 23	1.10 " "
¼	" 24	1.20 " "
¼	" 25	1.30 " "
¼	" 26	1.40 " "
3/16	" 13, 14 and 15	.90 " "
3/16	" 16, 17 and 18	1.00 " "
3/16	" 19 and 20	1.10 " "
3/16	" 21	1.20 " "
⅛	" 13, 14 and 15	1.10 " "
⅛	" 16, 17 and 18	1.20 " "
⅛	" 19 and 20	1.30 " "

ADDITIONAL EXTRAS

For cutting hoops or bands to special lengths not less than two feet . 5c per 100 lb.

For cutting hoops or bands less than two feet . . 20c per 100 lb.

For rounding one end of cut hoops 1¼ to 3 in. . 5c per 100 lb.

For each gauge lighter than indicated on list . 10c per 100 lb.

GALVANIZED SHEETS.

ADOPTED JULY 1, 1893.

Gauge.	Weight per sq. ft.	Price.
No. 10	92.5 oz.	
No. 11	82.5 "	
No. 12	72.5 "	
No. 13	62.5 "	12c per lb.
No. 14	52.5 "	
No. 15	47.5 "	
No. 16	42.5 "	
No. 17	38.5 "	
No. 18	34.5 "	
No. 19	30.5 "	13c per lb
No. 20	26.5 "	
No. 21	24.5 "	
No. 22	22.5 "	
No. 23	20.5 "	14c per lb.
No. 24	18.5 "	
No. 25	16.5 "	
No. 26	14.5 "	15c per lb.
No. 27	13.5 "	16c per lb.
No. 28	12.5 "	17 " "
No. 29	11.5 "	19 " "
No. 30	10.5 "	21 " "

ADDITIONAL PRICES ON EXTRA SIZES.

Nos. 16, 17, and 18—Over 36 to 40 . . . 1 c
Over 40 to 44 . . . 1½c
Over 44 to 48 . . . 2½c

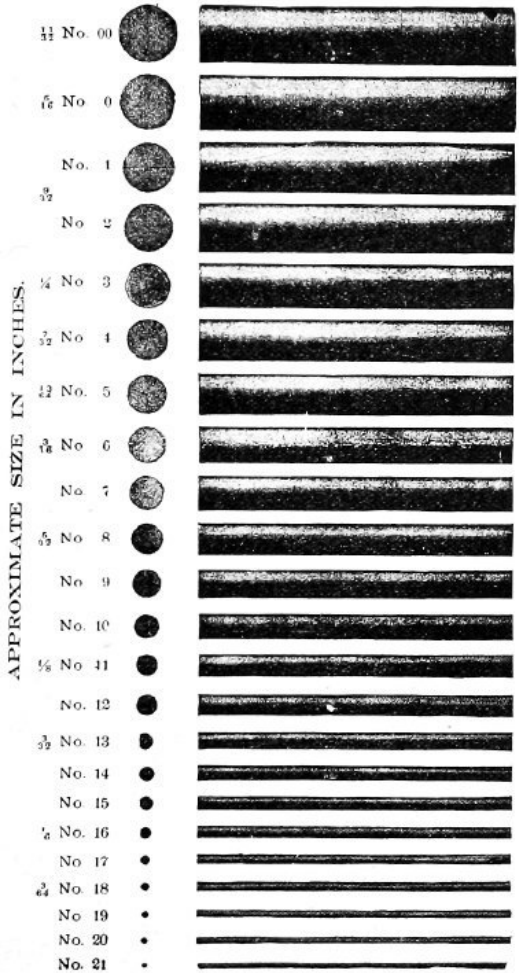
No. 19 and lighter—Less than 24 wide . . . 1 c
Over 32 to 36 . . . 1 c
Over 36 to 40 . . . 2 c
Over 40 to 44 . . . 3 c
Over 44 to 48 . . . 5 c

Extra Lengths—Longer than 120 . . . 1 c
Shorter than 60 . . . ½c

One-half cent per lb. additional for Pattern Sheets, i. e., for all iron of which every sheet in each bundle is required to be of exact length specified or where iron is ordered in sheets, all of which are required to be of the same length

	Gauges.	
Extreme Sizes—	14 to 24	44 x 126
	26 to 28	36 x 126

CUT SHOWING ACTUAL SIZE OF WIRE.



IRON AND STEEL WIRE.

Nos.	0000 to 9	10 and 11	12	13 and 14	15 and 16	17	18
Price, per lb.,	10c.	11	11½	12½	14	15	16

The following varieties of wire are sold on above list with varying discounts.

Bright Market Wire	per cent.
Bright Charcoal Wire	"
Annealed Market Wire	"
Annealed Fence Wire, Nos. 8 and 9	"
Coppered Market Wire	"
Coppered Furniture Spring Wire	"
Annealed Bessemer Steel Wire	"

TINNED WIRE

Nos.	0 to 9	10 and 11	12 to 14	15 and 16	17	18
Price, per lb.,	15c.	16	17	17½	18	18½

GALVANIZED MARKET WIRE.

Nos.	0 to 9	10 and 11	12	13 and 14	15 and 16	17	18
Price, per lb.,	10c.	11	11½	12½	14	15	16

CAST STEEL WIRE.

Nos.	⅛ in. to 6	7 to 9	10 and 11	12	13	14	15	16	17	18
Price, per lb.,	23c.	24	25	26	28	30	32	33	34	36

GALVANIZED TELEGRAPH AND TELEPHONE WIRE.

Of the Highest Electrical Qualities.

Table of Sizes and Weights.	E. B. B. Per lb.	B. B. Per lb.	Steel. Per lb.
No. 4 Wire, in ¼ mile bundles, 730 lbs. per mile			
No. 6 Wire, in ⅛ mile bundles, 540 lbs. per mile			
No. 8 Wire, in ⅛ mile bundles, 380 lbs. per mile			
No. 9 Wire, in ⅛ mile bundles, 320 lbs. per mile			
No. 10 Wire, in ⅛ mile bundles, 260 lbs. per mile			
No. 11 Wire, in ⅛ mile bundles, 214 lbs. per mile			
No. 12 Wire, in ⅛ mile bundles, 165 lbs. per mile			
No. 14 Wire, in ⅛ mile bundles, 90 lbs. per mile			

BRASS AND COPPER WIRE.

Prices are for 100 lbs. or more of Wire in Coils in one order

WIRE IN COILS.

BROWN AND SHARPE'S GAUGE THE STANDARD.

	Com. High Brass	Low Brass	Gild'g, Bronze and Copper
All Nos. to No. 10, inc.	$0.23	$0.27	$0.31
Above No. 10 to No. 16	.23½	.27½	.31½
Nos. 17 and 18	.24	.28	.32
" 19 and 20	.25	.29	.33
No. 21	.26	.30	.34
" 22	.27	.31	.35
" 23	.28	.32	.36
" 24	.30	.34	.38
" 25	.32	.36	.40
" 26	.35	.39	.43
" 27	.38	.42	.46
" 28	.42	.46	.51
" 29	.45	.49	.54
" 30	.48	.52	.62
" 31	.51	.55	.67
" 32	.55	.59	.73
" 33	.59	.63	.82
" 34	.64	.68	.95
" 35	.70	.74	1.30
" 36	.76	.80	1.50
" 37	1.00	1.04	1.70
" 38	1.30	1.34	2.00
" 39	2.00	2.00	3.25
" 40	2.60	2.60	5.75

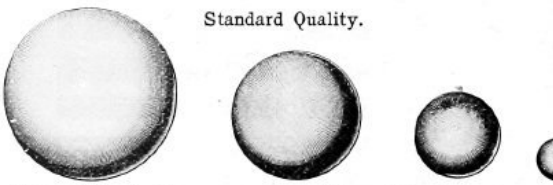
Spring Wire, 2 cents per pound advance.
Flat, Square and Half Round Wire, 4 cents advance per pound on Round Wire, gauged the thin way after finishing.
To determine the price of Flat Wire, add to the price of wire measured the smallest way.
Fancy Wire not less than 10 cents advance per pound on Round Wire.
Wire straightened and cut, No. 12 and smaller, 12 cents per pound additional. Same additions for cutting to length when under 2 feet as rods.
All Wire between gauges takes price of next smaller gauge.
Wires in coils, 3 pounds and under, the same extras as Spooling Wire of the corresponding weights.

SPOOLING WIRE.

On 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 pound spools.
At 12, 11, 10, 9, 8, 7, 6, 5, 4, 3 cents per pound.
Less than 1 pound spools, 24 cents per pound.

FINISHED TOOL STEEL BALLS.

Standard Quality.



Size.	Price per 1,000.
⅛ in	$ 5 25
5/32 "	3 75
3/16 "	1 28
7/32 "	1 65
¼ "	1 80
9/32 "	2 47
5/16 "	2 47
11/32 "	4 13
⅜ "	6 00
13/32 "	13 50
7/16 "	18 00
15/32 "	20 25
½ "	22 50

Size.	Price per 1,000.
17/32 in	$ 37 50
9/16 "	48 00
19/32 "	57 00
5/8 "	75 00
21/32 "	90 00
11/16 "	105 00
¾ "	135 00
13/16 "	195 00
7/8 "	240 00
15/16 "	300 00
1 "	412 50
1⅛ "	525 00
1¼ "	637 50

Size.	Price per 1,000.
2 in	$ 900 00
2⅛ "	1200 00
2¼ "	1350 00
2⅜ "	1800 00
2½ "	1950 00
2⅝ "	2400 00
2¾ "	2700 00
2⅞ "	3300 00
3 "	3900 00
3¼ "	4500 00
3½ "	6000 00
3¾ "	7500 00
4 "	9000 00

"B" Grade Tool Steel Balls.

Size.	Price per 1,000.
3/16 in	$1 05
7/32 "	1 43
¼ "	1 50

Size.	Price per 1,000.
7/16 in	$2 03
½ "	2 03
9/16 "	3 38

Size.	Price per 1,000.
⅝ in	$3 38
⅜ "	5 25

BRASS RODS.

We do not cut Brass Rods.

Brass Rods in 3, 6 and 9 foot pieces only.

Round Brass Rods.

Round Brass Rods,	Diameter, inches,	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1
	Per pound,	$0.30	.26	.24	.24	.24	.24	.24	.24	.24	.24

Square Brass Rods.

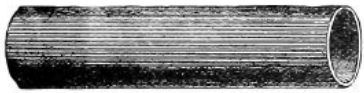
Diameter, inches,	1/8	3/16	1/4
Per pound,	$0.32	.28	.26

Hexagon Brass Rods.

Diameter, inches,	1/4	5/16	1/2
Per pound.	$0.26	.26	.26

BRASS TUBING.

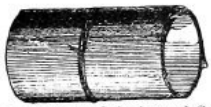
We do not cut Brass Tubing.



Brass Tubing in 3, 6 and 9 foot pieces only.

Brass Tubing, Plain Round.	Nos.,	**20**	**20**	**20**	**18**	**18**	**17**	**16**
	Diameter Outside, inches,	1/4	5/16	3/8	1/2	5/8	3/4	1
	Per pound,	$0.67	.50	.42	.38	.36	.35	.35

HIGH BRASS, IN ROLLS.



High Brass, suitable for Spinning and General Use.

High Spinning Brass.

Nos.,	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**
Width. **12 in.,** per pound,	$0.23	.23	.23	.23	.23	.23	.23	.24	.24
Width, **16 in.,** per pound,			.26	.26	.26	.27	.27	.28	.29

Full Rolls Weigh from 25 to 50 lbs. Each.

HIGH BRASS, IN SHEETS.

We do not cut Brass Sheets.

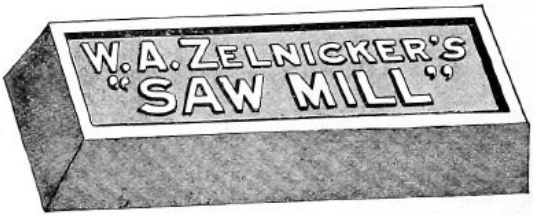
High Brass, in **Sheets.** 24 x 48 in., **Half Hard,**	Nos.,	**16**	**18**	**20**	**22**	**24**
	Average Weight per Sheet, lbs.,	19	15	12	9	7
	Per pound,	$0.34	.34	.40	.48	.56

Use Brown & Sharpe's Gauge for all Tubes and Sheets.

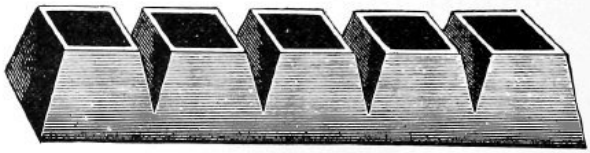
BABBITT METAL.

Zelnicker Babbitt is a strictly high-grade metal, specially prepared for electrical machinery and all high-speed bearings.....per lb., $

W. A. Z. Babbitt is the equal of any anti-friction metal on the market. A high-grade Babbitt at a moderate price.....per lb., $



Saw Mill Babbitt is a first-class metal where the speed is not over 600 revolutions, per lb.....$



No. 4 Babbitt Metal.....per lb., $

Metals.

In pigs of about 100 pounds.

Per pound.....

Sheet Lead.

Per pound.....

Spelter, or Slab Zinc.

In Slabs of about 80 pounds.

Per pound.....

In Pigs.

Of 25 and 100 pounds.

Per pound.....

In 2 pound bars.

Per pound.....

Ingot Copper.

About 40 pound Ingots.

Per pound .....

Solder.

Half and Half.

Per pound.....

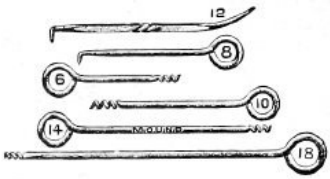
Antimony.

In Cakes.

Per pound.....

Engineers' Chums

Packing Tools



Every Engineer knows the importance and value of good tools around the engine room, and the inconvenience and loss of time and annoyance caused by the lack of them. Not the least in the list of engine room tools is a set of Packing Tools.

These tools are made from a special tool steel, are warranted not to break or bend in removing packing from stuffing boxes of engines, pumps, etc., and need only to be seen to be appreciated. Handsomely Nickel-plated.

Sizes.....4, 8, 10, 12, 14, 16, 18, 20.

Set of 4 Packing Tools.....$1 50
Set of 6 Packing Tools.....2 25

Improved Scraping Tools

For Scraping Valves, Journals, Bearings, Etc., Etc.

There are 6 Scrapers, as shown in the cut, in each set. They vary in size from 8 to 14 inches. The Scrapers are made of the best tool steel, carefully forged, tempered and polished, so that they are true to shape and possess the proper temper for effective work. In Oak case, conveniently made, so that they can always be found together in the tool room.

Set of 6 Scraping Tools, in Oak case.....$2 50

Used by leading engineers, and by the U. S. Navy.

Cold Chisels

These Chisels are made from a high grade crucible steel that costs twice as much as the steel usually found in blacksmith shops, thus insuring good results in forging and tempering. These Chisels are made up in sets of 5 tools—a flat Chisel, a narrow cape Chisel, a bent grooving Chisel for cutting oil ways in engine brasses and bearings, a diamond point and a calking tool, suitable for calking seams and rivets of boilers. The average length is about 8 inches. Made of ¾ and ⅝-inch steel.

Set of 5 Cold Chisels.....$2 00
Highly Polished.....2 50

ENGINEERS' FIRING TOOLS.

Length.	Diameter of Bar.	Hoe.	Slice Bar.	Clinker Hook.	Poker.
6 feet	⅝ inch	$ 3 00	$ 2 40	$ 3 00	$2 00
7 "	¾ "	3 70	3 10	4 00	2 70
8 "	¾ "	4 50	3 80	4 60	3 30
9 "	⅞ "	6 50	5 70	5 70	4 00
10 "	⅞ "	7 70	7 60	7 20	5 00
11 "	1 "	9 50	9 50	9 00	6 00
12 "	1 "	11 50	11 50	11 00	7 00

Any size or special design will be made to order.

ZELNICKER FLUE CLEANER.

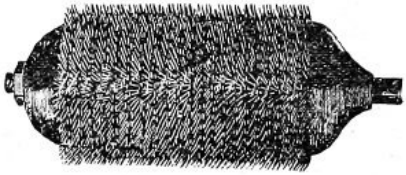
The steam leaves the head of the cleaner through curved outlets which extend to its mouth, thus causing the steam to continue spirally through the tube. A sufficient amount of air passes in with the steam to prevent a vacuum and assist the steam in cleaning the flue.

Each.....$

SPIRAL TUBE BRUSH.

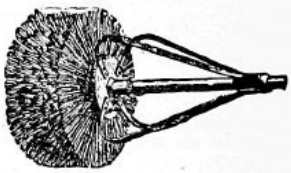
Sizes, 1 to 6 inches.....Price per inch, $1.00

ABRAM STEEL WIRE FLUE BRUSH.



Sizes, 1 to 6 inches.....Price per inch, $1.00

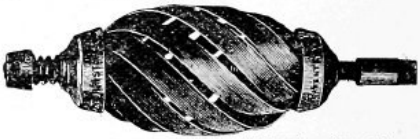
LARGE STEEL WIRE FLUE BRUSH.



Eight inches and larger.....Per inch, $1.00

COIL BRUSH AND SCRAPER COMBINED.

CHRISTOFFEL'S ELLIPTIC.



—Can be Expanded or Contracted

Size...In.	1–1¼	2	2¼	2½	2¾	3	3¼	3½	3¾	4
Price.....	$1.00	1.10	1.20	1.30	1.40	1.50	1.65	1.75	1.90	2.00

Over 4 inch 25 cents per inch.

Size.....In.	1 to 2	2¼	2½	2¾	3	3¼	3½	3¾	4
Price.....	$2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00

Over 4 inch $1.25 per inch.

FLUE CLEANERS.

"THE ENGINEERS' FAVORITE."

Size....Inches	1¼	1½	2	2¼	2½	2¾	3	3¼	3½	4	4½	5	6
Price....Each	$2 00	2 00	2 00	2 25	2 50	2 75	3 00	3 25.	3 50	4 00	4 50	6 25	7 50

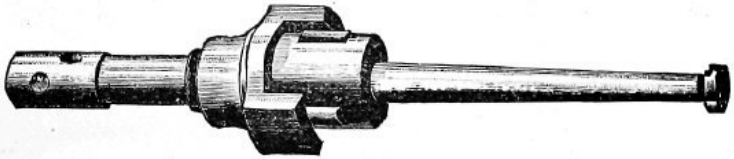
THE PERFECT FLUE CLEANER

Is self-sharpening, and the only Flue Cleaner that will not wear out before the metal is worn through.

Flue Cleaners—Perfect.....per inch

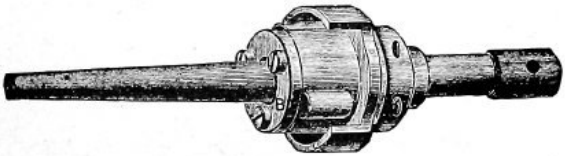
Made of steel, blades being self-sharpening, cut the soot and dirt away without hurting the tube.

ROLLER TUBE EXPANDER.



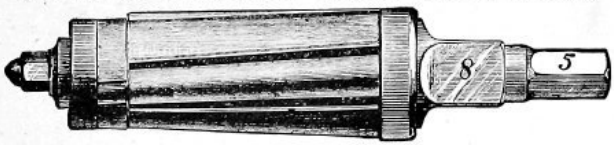
Diam.	Price.	Diam.	Price.
1 inch	$10.00	2¼ inch	$16.00
1¼ "	10.00	3 "	18.00
1½ "	10.00	3¼ "	20.00
1¾ "	10.00	3½ "	23.00
1⅞ "	10.00	4 "	30.00
2 "	10.00	4¼ "	35.00
2¼ "	12.00	4½ "	40.00
2½ "	14.00	5 "	50.00

IMPROVED ROLLER TUBE EXPANDER.



	Price.	Diam.	Price.
1⅝ and 1¾ inches	$20.00	3½, 3⅝ and 3¾ inches	$70.00
1¾ " 1⅞ "	20.00	3¾, 3⅞ " 4 "	75.00
1⅞ " 2 "	25.00	4, 4⅛ " 4¼ "	80.00
2, 2⅛ and 2¼ "	30.00	4¼, 4⅜ " 4½ "	85.00
2¼, 2⅜ " 2½ "	26.00	4½, 4⅝ " 4¾ "	85.00
2½, 2⅝ " 2¾ "	39.00	4¾, 4⅞ " 5 "	90.00
2¾, 2⅞ " 3 "	45.00	5, 5¼ " 5½ "	100.00
3, 3⅛ " 3¼ "	52.00	5½, 5¾ " 6 "	105.00
3¼, 3⅜ " 3½ "	60.00	6, 6¼ " 6½ "	115.00

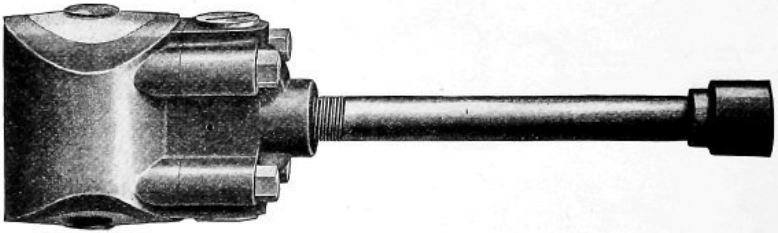
COLLINS ROLLER TUBE EXPANDER.



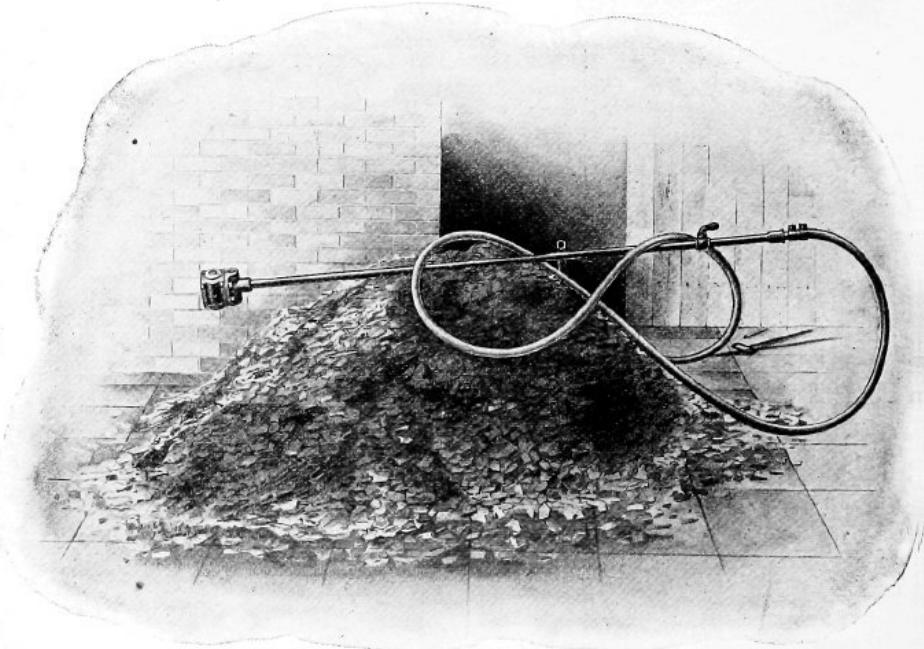
Needs no hammering. The only self-feed expander tube on the market.

Outside Diam. of Tubes.	Price.	Outside Diam. of Tubes.	Price.
1¼ inches	$12.00	2¼ inches	$21.00
1½ "	12.00	3 "	22.00
1¾ "	14.00	3¼ "	24.00
1⅞ "	14.00	3½ "	28.00
2 "	15.00	3¾ "	30.00
2¼ "	18.00	4 "	85.00
2½ "	20.00		

STEAM SCALE KNOCKER.



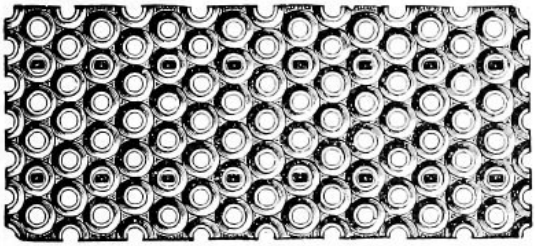
Is without doubt the most simple and the most effective device for the removal of scale from RETURN TUBULAR BOILERS.



Above cut is a reproduction of a photograph of 2,300 lbs. of scale, which was taken out of one 60 inch and two 66 inch boilers, in a plant in St. Louis, by a 6 inch STEAM SCALE KNOCKER. This pile of scale was taken out in about twenty hours by two men.

No. 1.	2 inch	Special	each, $195 00
No. 2.	3 "	and 3½ inch	" 90 00
No. 3.	4 "		" 100 00
No. 4.	6 "		" 115 00

EDGAR GRATE BARS.



No Dead Space in this Bar.

Carefully examine the above Bar, for it will save the owner money and the Engineer worry and trouble; and then consider the following few questions and answers:

Question—What do you want a Grate Bar for?
Answer—To hold up fuel to raise steam with.

Question—How can the most steam be raised from a limited surface of grates?
Answer—By getting all the air possible through the Bars to the fire. Now look at the above: we guarantee that it gives **25 per cent. more air space than any other Bar made.**

Question—What causes Bars to Break and Burn out?
Answer—Expansion and contraction; but by keeping a bar cool, this cannot occur; and this the Edgar Grate Bar does. Furthermore, **those holes directly over the ribs prevent** the ribs from **getting hot.** Look at any other Bar, and you will see **Dead Space** over the Ribs; well, that's our idea and patent, and a deserved one; further, the Edgar Bar will not get **red hot** if you keep ashes from under it; therefore, it **cannot burn out.**

CENTER BEARING BARS.

Size of Boiler, in. . .	36	42	48	54	60	66	72
Length, in.	42	48	54	60	66	72	78
Weight, lbs.	60	70	95	100	145	175	200

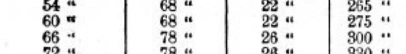
BACK ANGLE BARS.

Size of Boiler, in. . .	36	42	48	54	60	66	72
Length, in.	46	52	58	64	70	82	82
Weight, lbs.	47	53	65	70	93	133	133

BACK SKELETON ARCH.

Size of Boiler.	Length.	Radius.	Weight.
36 in.	48 in.	18 in.	150 lbs.
42 "	48 "	18 "	170 "
48 "	58 "	20 "	235 "
54 "	68 "	22 "	265 "
60 "	68 "	22 "	275 "
66 "	78 "	26 "	300 "
72 "	78 "	26 "	330 "

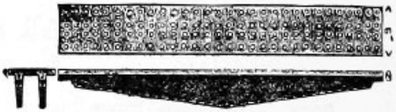
WALL BINDERS.



Wall Binders furnished any size or length desired. Please state distance from center to center of holes in ordering.

Size of Boiler.	Weight of Side Binder.	Distance Between Holes.	Weight of End Binder.		
36 in.	60 lbs.	4 ft. 8 in.	60 lbs.	2 ft. 5 in.	2 ft. 11 in.
42 "	75 "	6 " 0 "	75 "	2 " 6 "	2 " 9 "
48 "	100 "	7 " 0 "	90 "	3 " 4 "	3 " 8 "
54 "	109 "	8 " 0 "	104 "	3 " 4 "	4 " 2 "
60 "	110 "	8 " 4 "	105 "	3 " 7 "	4 " 6 "
66 "	198 "	9 " 3 "	160 "	4 " 0 "	4 " 6 "
72 "	198 "	9 " 3 "	160 "	4 " 0 "	4 " 6 "

SHAVING GRATE BARS.



Length, in.	30	36	42	48	54	60
Width, in.	6	6	6	6	6	6
Weight, lbs.	32	45	59	72	82	94

COMMON GRATE BARS.

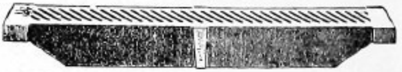
HEAVY PATTERN.

Length.	Width.	Weight.	Air Space.
42 in.	3 in.	50 lbs.	⅝ in.
48 "	3 "	60 "	⅝ "
50 "	3 "	62 "	⅝ "
54 "	3 "	68 "	⅝ "
60 "	3 "	85 "	⅝ "
66 "	3½ "	100 "	⅝ "
72 "	3½ "	110 "	¾ "

LIGHT PATTERN.

Length.	Width.	Weight.	Air Space.
24 in.	2¾ in.	20 lbs.	½ in.
26 "	2¾ "	22 "	½ "
27 "	2¾ "	23 "	½ "
28 "	2¾ "	24 "	½ "
30 "	2¾ "	26 "	½ "
33 "	2¾ "	34 "	½ "
36 "	3 "	36 "	½ "
42 "	3 "	40 "	½ "
48 "	3 "	48 "	½ "
54 "	3 "	54 "	½ "
60 "	3 "	68 "	½ "

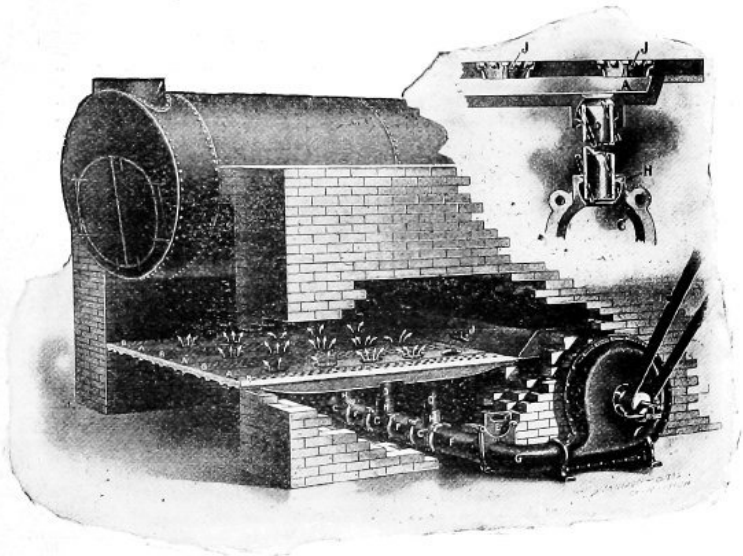
OBTUSE GRATE BARS.



Length.	Width.	Weight.	Air Space.	Metal.
30 in.	5 in.	5[illegible] lbs.	⅜ in.	⅜ in.
36 "	5 "	60 "	⅜ "	⅜ "
39 "	6 "	86 "	⅜ "	⅜ "

Length.	Width.	Weight.	Air Space.
48 in.	2¼ in.	48 lbs.	⅜ in.
54 "	2¼ "	54 "	⅜ "
60 "	2¼ "	71 "	⅜ "
66 "	2¼ "	76 "	⅜ "

GORDON HOLLOW BLAST GRATE.



Makes the hottest fire of any Grate ever invented.

Develops every ounce of power a boiler is capable of generating, regardless of the weather or the character or condition of the fuel.

Burns wet, green or frozen sawdust or other refuse readily.

Outlasts from three to five draft Grates.

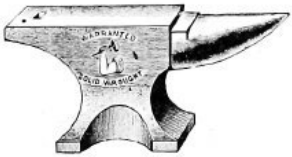
Important.—In writing for prices, do not fail to give number of boilers, width of furnaces or ovens, and length of grates desired, or, better still, fill out one of our measurement blanks, the information asked for which must, in any event, be given before we can fill an order.

BLACKSMITHS TOOLS.

SOLID WROUGHT

General Blacksmith Anvil

80 to 400 lbs base.



70 to 79	½ cts.	per lb.	Extra
60 to 69	1 "	"	"
50 to 59	2 "	"	"
40 to 49	3 "	"	"
30 to 39	5 "	"	"
20 to 29	8 "	"	"
10 to 19	15 "	"	"
Farriers Clip Horn	1 "	"	"

VISE BOXES AND SCREWS.

Number,		1	2	3	4	5	6
Price,	Each,	3.50	4.00	4.50	6.50	8.00	9.50
Diameter of Screw,	Inches,	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{3}{4}$
For Vises Numbers from		30 to 50	55 to 70	75 to 85	90 to 100	105to125	130to195

BELLOWS.

Standard.

Moulders.

STANDARD BELLOWS.

Width,	Inches,	24	26	28	30	32	34	36	38	40
Price,	Each,	10.00	11.00	12.00	13.00	14.00	16.00	18.00	20.00	23.00

STANDARD EXTRA LONG BELLOWS.

Width,	Inches,	24	26	28	30	32	34	36	38	40
Price,	Each,	12.00	13.00	14.00	15.00	17.00	19.00	21.00	24.00	28.00

HAND BELLOWS.

Width,	Inches,	6	7	8	9	10	11	12
Price,	Per Doz.,	6.00	7.00	8.00	9.00	10.00	11.00	12.00

MOULDERS BELLOWS.

Width,	Inches,	10	11	12
Price,	Per Doz.,	12.00	15.00	18.00

BLACKSMITHS' TOOLS.

TOP SWEDGE.

BOTTOM SWEDGE.

TOP FULLER.

BOTTOM FULLER.

FLATTERS.

HARDIES.

SET HAMMER.

PRICE LIST.

Swedges, Top or Bottom, ¼ to 4½ inch	Per pound,	$0.50
Fullers, Top or Bottom, ¼ to 3 inch	"	.50
Flatters, ¼ to 4½ inch	"	.50
Hardies, Shanks, ¼ to 1½ inch	"	.50
Set Hammers, 1 to 2½ inch	"	.50

COLD CHISEL.

HOT CHISEL.

SQUARE PUNCH.

ROUND PUNCH.

Price.....Per pound, $0.50 | Price.....Per pound, $0.50 | Price.....Per pound, $0.50 | Price.....per pound, $0.50

BLACKSMITHS' TONGS.

STRAIGHT LIP.

GAD.

SINGLE PICK UP.

BOLT.

DOUBLE PICK UP.

ROUND JAW.

RIVET.

PRICE LIST

Size	Inches	14	16	18	20	22	24	26
Straight Lip	Per dozen	$6.75	7.75	8.75	9.75	11.00	12.50	14.00

Gad Tongs.....Per pound, $0.40
Bolt " ..... " .40
Round Jaw Tongs..... " .40

Single Pick Up Tongs.....Per pound, $0.40
Double " " ..... " .40
Rivet Tongs..... " .60

HEADING TOOLS.

Solid Cast Steel, ⅞ to 1 inch, by eighths per pound, 25c.

CHISELS AND PUNCHES.

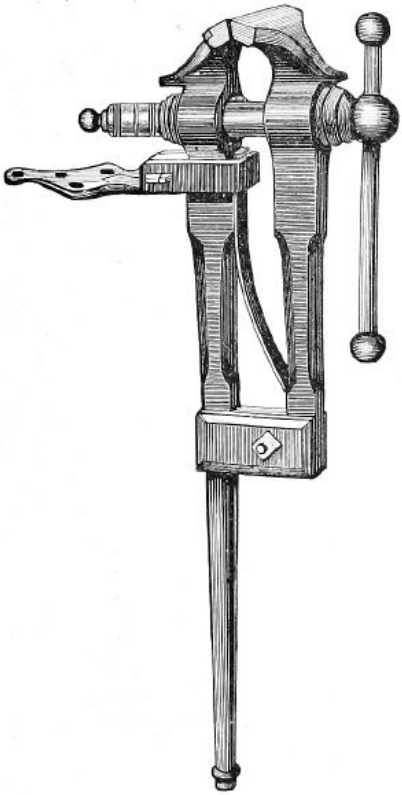
HAND COLD CHISELS.

Solid Cast Steel, Polished Ends, ⅞ to 1 inch face, per pound 25c.

HAND PUNCHES.

Solid Cast Steel ⅞ to 1 inch face. per pound, 25c.

SOLID BOX VISES.



Width Jaw.	Weight About	Price.
3¾ inch.....	35 lbs.	$10 00
4 "	40 "	10 50
4¼ "	45 "	11 00
4½ "	50 "	11 50
4¾ "	55 "	12 00
5 "	60 "	13 00
5 "	65 "	14 00
5¼ "	75 "	16 00
5½ "	80 "	17 50
5½ "	85 "	18 50
5¾ "	90 "	20 00
5¾ "	95 "	21 00
6 "	100 "	22 00
6 "	110 "	24 00
6½ "	120 "	26 00
6½ "	130 "	29 00
7 "	140 "	33 00
7 "	150 "	36 00
7¼ "	160 "	41 50
7¼ "	170 "	44 50
7½ "	180 "	47 00
8 "	200 "	56 00

Standard pattern. Full weights guaranteed.
These are the best Solid Box Vises made.

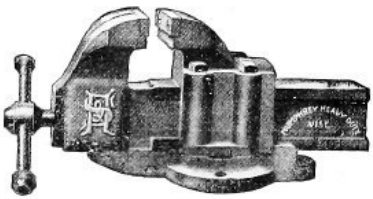
THE HUMPHREY HEAVY DUTY VISE.

The jaws are 6½ inches wide. The false jaws are of heavy tool steel milled to a perfect seat; ragged and tempered.

The sliding jaw is finished to a close fit and has a long bearing in stationary base. The under lip is extra long and has ample strength to take the strain even if the jaws are 6 inches apart.

The screw is 1¼ steel stock with square thread, lathe cut.

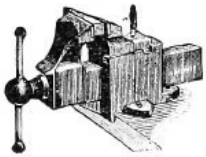
The nut is 4½ inches long and made of phosphor bronze.



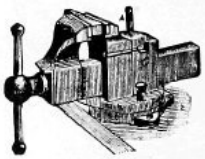
Weighs 175 lbs. Price.....$25 00

PRENTISS PATENT ADJUSTABLE JAW VISES.

Stationary Bottom.



Swivel Bottom.



STATIONARY BOTTOM

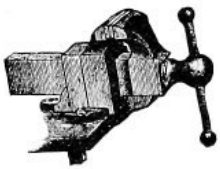
Number,		1	2	2½	3	4	5	7
Price,	Each,	5.50	7.00	9.00	10.50	17.00	24.00	30.00
Width of Jaws,	Inches,	2⅝	3½	4	4½	5¼	6	7
Opens,	"	3½	4¾	5¼	6	8	9	11
Weight,	Pounds,	13½	28	41	54	96	146	184

SWIVEL BOTTOM.

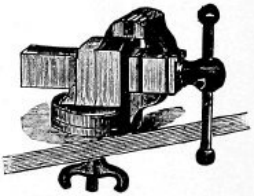
Number.		18	19	19½	20	21	22	23
Price,	Each,	6.75	8.50	10.50	12.50	19.00	27.00	35.00
Width of Jaws,	Inches,	2⅝	3½	4	4½	5¼	6	7
Opens,	"	3½	4¾	5¼	6	8	9	11
Weight,	Pounds,	17	32	46	65	109	168	207

MACHINISTS BULL-DOG VISES.

Stationary Bottom.



Swivel Bottom.



STATIONARY BOTTOM.

Number,		50	51	52	53	54	55	53
Price,	Each,	6.00	7.00	8.50	10.00	13.00	18.50	25.00
Width of Jaws,	Inches,	3¼	3⅝	4⅛	4⅝	5	5½	6
Opens,	"	4	5	5½	6¼	7	8½	9
Weight,	Pounds,	22	28	42	52	72	100	135

SWIVEL BOTTOM.

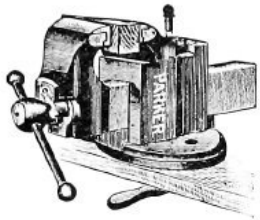
Number.		90	91	92	93	94	95	96
Price,	Each,	7.50	8.75	10.50	12.50	16.00	22.00	30.00
Width of Jaws,	Inches,	3¼	3⅝	4⅛	4⅝	5	5½	6
Opens,	"	4	5	5½	6¼	7	8½	9
Weight,	Pounds,	28	36	52	64	85	115	155

PARKERS VICTOR VISES.

SELF-ADJUSTING BACK JAWS.

Stationary Bottom.

Swivel Bottom.



STATIONARY BOTTOM.

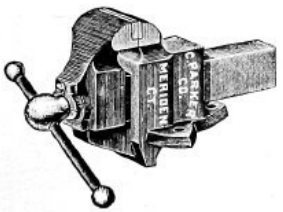
Number,		370	371	378	372	373	374	375	340
Price,	Each,	6.50	7.00	8.00	10.00	14.00	17.00	24.00	30.00
Width of Jaws.	Inches,	3 1/4	3 5/8	4 1/4	4 1/2	5	5 1/2	6 1/4	7 1/2
Weight,	Pounds,	25	39	42	57	73	98	150	185

SWIVEL BOTTOM.

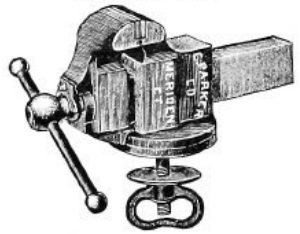
Number,		270	271	278	272	273	274	275	240
Price,	Each,	7.00	8.50	10.00	12.50	16.00	19.00	27.00	35.00
Width of Jaws,	Inches,	3 1/4	3 5/8	4 1/2	4 1/2	5	5 1/2	6 1/4	7 1/2
Weight,	Pounds,	30	42	48	60	78	110	165	200

PARKERS VULCAN VISES.

Stationary Bottom.



Swivel Bottom.



STATIONARY BOTTOM.

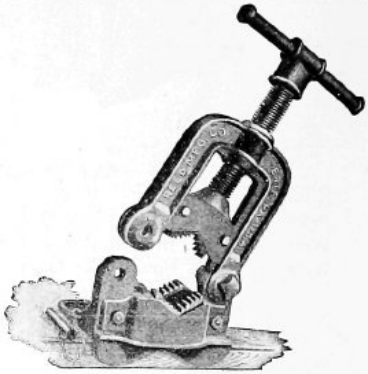
Number,		A	B	C	D	E	F	G
Price,	Each,	6.00	7.00	8.50	10.00	13.00	18.50	25.00
Width of Jaws,	Inches,	3 1/4	3 5/8	4 1/8	4 5/8	5	5 1/2	6
Opens,	"	4 1/2	5	5 1/2	6 1/2	7	8 1/2	9 1/2
Weight,	Pounds,	25	28	46	60	74	100	135

SWIVEL BOTTOM.

Number,		AA	BB	CC	DD	EE	FF	GG
Price,	Each,	7.50	8.75	10.50	12.50	16.00	22.00	30.00
Width of Jaws,	Inches,	3 1/4	3 5/8	4 1/8	4 5/8	5	5 1/2	6
Opens,	"	4 1/2	5	5 1/2	6 1/2	7	8 1/2	9 1/2
Weight,	Pounds,	28	37	52 1/2	66	86	115	156

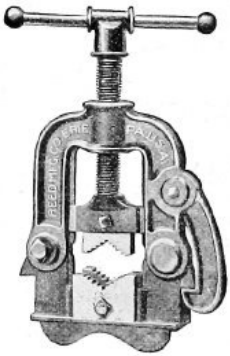
MALLEABLE HINGED PIPE VISE.

No.	Capacity.	List Vise, Each.	List Jaws, Set (3).
1A	⅛ to 2 inch pipe	$10 00	$3 75
2A	¼ " 3 " "	14 00	5 25
3A	½ " 4 " "	20 00	7 50



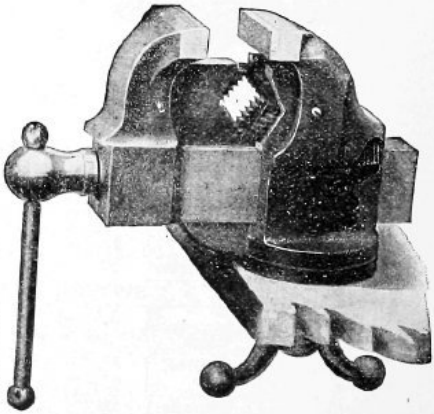
SECTIONAL JAW PIPE VISE.

No.	Capacity.	List, Each.
1	⅛ to 2 inch pipe	$10 00
2	¼ " 3 " "	14 00
3	½ " 4 " "	20 00



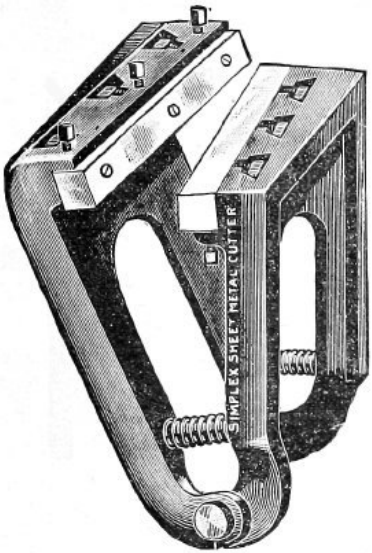
SELF-LOCKING MALLEABLE PIPE VISE.

No.	Capacity.	List Vise, Each.	List Jaws, Set (3).
1B	⅛ to 2 inch pipe	$10 00	$3 75
2B	¼ " 3 " "	14 00	5 25
3B	½ " 4 " "	20 00	7 50



COMBINATION PIPE VISE.

No.	Width Jaw.	Weight.	Capacity Pipe.	Base.	List Price.
1	3¾ in.	50 lbs.	⅛ to 2 in.	Swivel	$16 00
2	4½ "	70 "	⅛ " 3 "	"	20 00
3	5½ "	120 "	½ " 4 "	Stationary	28 00



SIMPLEX SHEET METAL CUTTER.

This device, when placed between the jaws of an ordinary bench vise (which can be done in a second), becomes a powerful and unique Sheet Metal Shear or Cutter, capable of doing work little short of wonderful, and heretofore considered impossible.

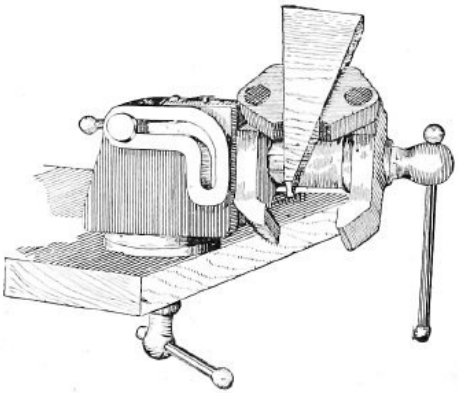
SIZES AND PRICES.

These machines are made in three sizes, as follows:

No. 1.	For 3½ inch vise	each,	$6 00
No. 2.	" 4½ " "	"	7 50
No. 3.	" 5½ " "	"	9 75

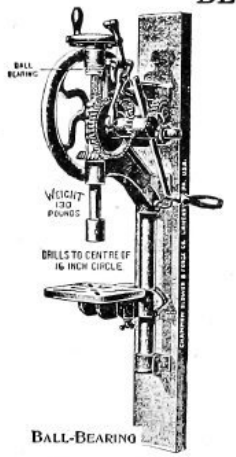
UNIVERSAL MACHINISTS' AND PATTERN MAKERS' VISES.

The accompanying cut represents one of the adjustments and uses of the new Universal Tool Makers' and Metal Workers' Vise. This vise is so constructed as to be used in any conceivable position. It is supplied with one set of groove jaws to hold all classes of round work, one set of jaws which will hold any class of taper work, one set to hold copper work and one set to hold any size of ring. It is also supplied with a rough jaw for cast iron work. with one smooth jaw for finished work and with pipe jaws.

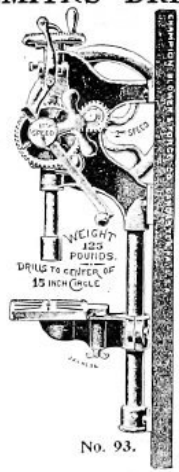


No. 6.	Machinists' Vise, 3 inch jaw, 5 inch opening	each,	$10 00
No. 4.	" " 4 " " 6 " "	"	15 00
No. 2.	Pattern Makers' Vise, 5x14, opens 12 inches	"	15 00
No. 1.	" " " 7x18½, " 14 "	"	18 00

BLACKSMITHS' DRILLS.



BALL-BEARING



No. 93.

No. 93½

No. 90

The New Champion Ball-Bearing Self-Feed Blacksmith Post Drill. Weight 130 lbs., ... $12.50
Extra, for Power, ... 3.00

No. 93 Champion Self-Feed Blacksmith Post Drill. Weight 125 lbs., $10.00
Extra, for Power, ... 3.00

No. 93½ Champion Self-Feed Blacksmith Post Drill. Weight 115 lbs., $9.50
Extra, for Power, ... 3.00

No. 90 Champion Self-Feed Blacksmith Post Drill. Weight 100 lbs., $8.50
Extra, for Power, ... 3.00

No. 92 Champion Hand-Feed Post Drill. Weight 65 lbs., ... $6.00

No. 101 Champion Self-Feed Blacksmith Post Drill. Weight 80 lbs., $7.00

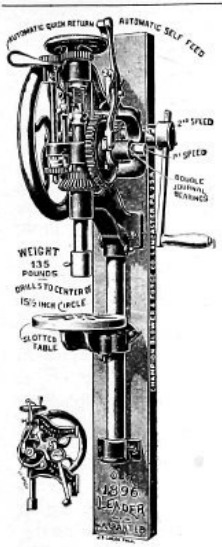
No. 98 Champion Self-Feed Blacksmith Post Drill. Weight 95 lbs., ... $8.00
Extra, for Power, ... 3.00

No. 98

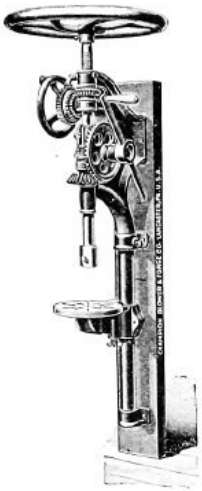
No. 92

No. 101

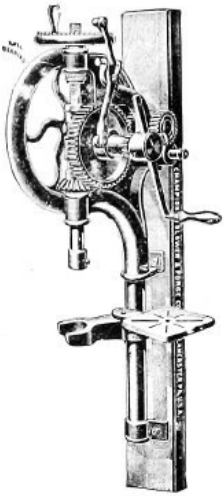
BLACKSMITHS' DRILLS.



No. 96.



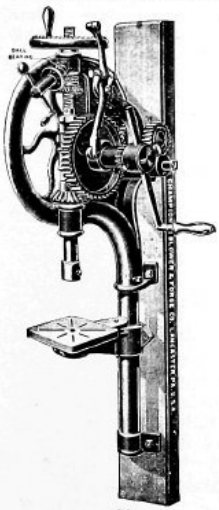
No. 2½.



No. 4.

No. 96. Champion Quick-Return Blacksmith Self-Feed Post Drill, weight 135 lbs..... $12 50
Extra for power..... 3 00

No 2½. Champion Single-Geared Upright Self-Feed Drill, weight 130 lbs..... 16 00



No. 4½.

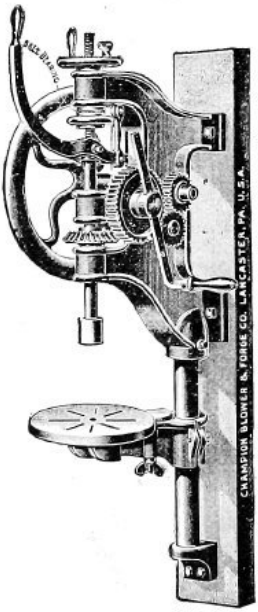
No. 4. Champion New Improved 18 inch Swing Three-Geared Ball-Bearing Upright Self-Feed Blacksmith Post Drill, weight 200 lbs..... 20 00

No. 4. Champion New Improved 18 inch Swing Three-Geared Upright Self-Feed Blacksmith Post Drill, without ball bearings, weight 200 lbs..... 17 50
Extra for power..... 3 00

No. 4½. Champion New Improved 18 inch Three-Geared Ball-Bearing Upright Self-Feed Blacksmith Post Drill, with quick return and hand feed handle, weight 210 lbs..... 22 00

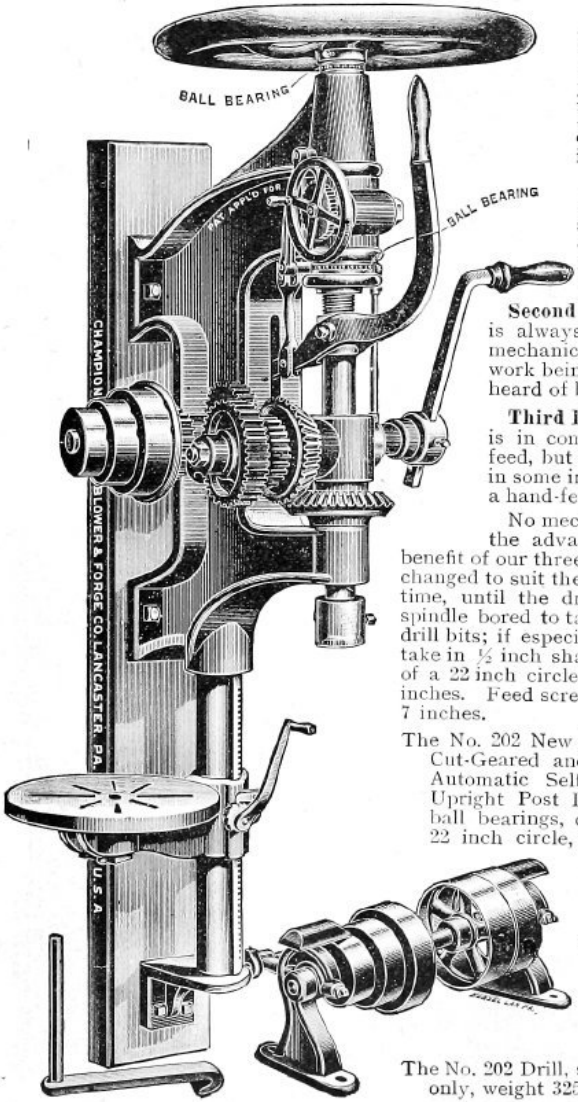
No. 4½. Champion New Improved 18 inch Three-Geared Upright Self-Feed Blacksmith Post Drill, with quick return and hand feed handle, without ball bearings, weight 210 lbs..... 19 00
Extra for power..... 3 00

The No. 200 Champion Patented Combination Automatic Self-Feed and Lever-Feed Upright Post Drill, has ball bearings and drills to the center of a 16 inch circle, weight 160 lbs..... 28 00
Extra for Tight and Loose Pulleys for power..... 4 00



No. 200.

No. 202 POST DRILL.



The No. 202 New Champion Patented Combination Double Back-Geared Upright Post Drill has many advantages never before seen in a Post Drill, which will save at least one-third in time and far more in labor.

First Feed is the Automatic Self-Feed, which is a continuous screw-feed, making it the only continuous and perfect automatic self-feed ever placed on a hand drill.

Second Feed is the Lever-Feed, which is always in readiness and gives the mechanic a choice of feeds to suit the work being drilled, an advantage never heard of before.

Third Feed is the Wheel-Feed, which is in combination with the automatic feed, but without a change may be used in some instances to good advantage as a hand-feed.

No mechanic can possibly appreciate the advantages gained by having the benefit of our three different feeds, which can be changed to suit the work to be done from time to time, until the drill is seen working. It has spindle bored to take in 31/64 inch straight shank drill bits; if especially ordered, will be bored to take in ½ inch shank bits. Drills to the center of a 22 inch circle. Drills holes from 0 to 1½ inches. Feed screw has an up-and-down run of 7 inches.

The No. 202 New Champion Combination Cut-Geared and Double Back-Geared Automatic Self-Feed and Lever-Feed Upright Post Drill has cut gears and ball bearings, drills to the center of a 22 inch circle, with cone pulleys and cone counter shaft complete, for power and hand combined, weight 440 lbs..... $80 00

The No. 202 Drill, same as above, for hand and power combined, with tight and loose pulleys for power, weight 340 lbs..... 70 00

The No. 202 Drill, same as above, for hand only, weight 325 lbs..... 65 00

Lancaster.

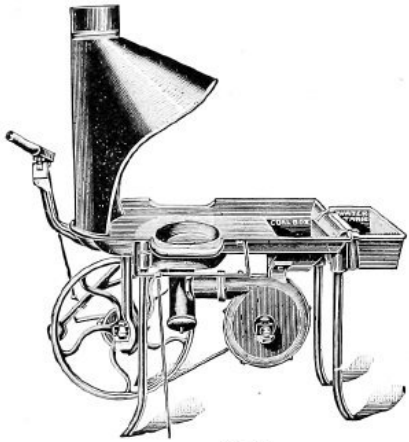
THE LANCASTER COG-GEARED RIVET FORGE.

The Lancaster Cog-Geared Rivet Forge is in its cog-gearing construction precisely like the Lancaster Cog-Geared Blower. This forge is constructed from structural steel and steel plate, making it a light and compact Forge good for farm use and wherever a good cheap Forge is wanted for riveting or any kind of light and medium work.

The Lancaster Cog-Geared Rivet Forge, fan 9 inches and hearth 18 inches in diameter, weight 100 lbs.....$20 00

CHAMPION NEW STANDARD IMPROVED BLACKSMITHS' LEVER FORGE.

No. 1. Champion New Standard 1900 Improved Blacksmiths' Lever Forge, hearth 32x45 inches, height 30 inches, fan 16 inches, with pressure blast wheel, weight 350 lbs., without water tank.....$50 00
With water tank, weight 375 lbs..... 55 00



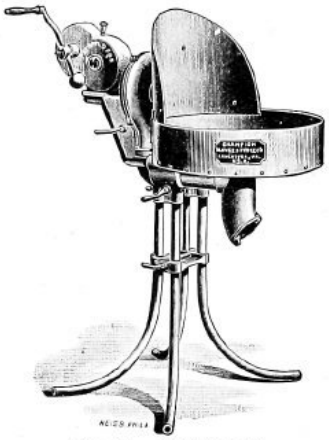
No. 1.

No. 150. With Shield.

THE CHAMPION AGRICULTURAL LEVER FORGE.

No. 150 Champion Agricultural Lever Forge has been on the market for over 10 years and has established a demand for itself that would surprise the wildest calculator. It fully meets the demands of farmers and for all kinds of light repair work. Size of hearth 18 inches diameter, 4 inches deep, weight 65 lbs., height 30 inches.

No. 150. Champion Agricultural Lever Forge, with shield.....$14 00
No. 151. Champion Agricultural Lever Forge, with half hood..... 16 00



No. 401. With Shield.

THE CHAMPION STEEL RIVET FORGE.

Made with Adjustable Ball Bearings Only.

This Forge is adapted for Government use, Elevated and Steam Railroads, Bridge and Tank Builders, Miners and Prospectors, Boiler Repairers, or any portable work requiring compactness and lightness, with a strong blast. If necessary, it will produce blast to weld 3½ to 4 inch iron in ten minutes. The crank to produce the blast can be turned either way.

No. 401. Champion Steel Rivet Forge, with shield, hearth 18 inches in diameter, height 30 inches, fan 9 inches in diameter, weight 90 lbs., $35 00

No. 401½. Champion Steel Forge, with shield, hearth 22 inches in diameter, fan 9 inches in diameter, weight 100 lbs. 40 00

No. 402½. Champion Steel Tool Makers' Forge, with half hood, hearth 22 inches in diameter, height 30 inches, fan 9 inches in diameter, weight 105 lbs. 43 00

No. 403½. Champion Steel Tool Makers' Forge, with half hood, hearth 22 inches in diameter, height 30 inches, fan 9 inches in diameter, weight 110 lbs. 45 00

No. 401¾. Champion Steel Forge with shield, hearth 24 inches in diameter, fan 10 inches in diameter, height 30 inches, weight 110 lbs. 45 00

No. 402¾. Champion Steel Forge, same as above, with half hood, weight 115 lbs. 48 00

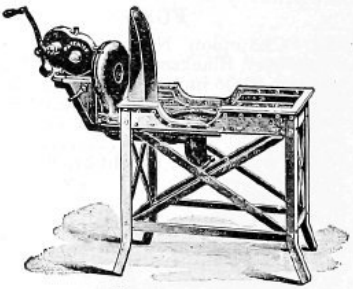
No. 403¾. " " " " " " " full " " 120 " 50 00

THE CHAMPION STEEL RIVET FORGE.

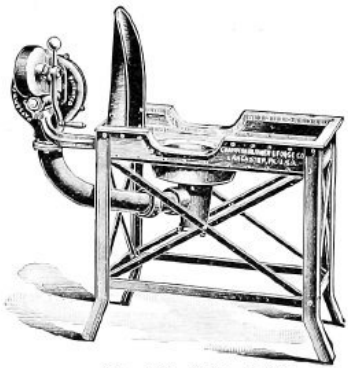
Made with Adjustable Ball Bearings Only.

No. 404. Champion Steel Rivet Forge, with shield, hearth 24x24 inches, height 30 inches, fan 9 inches in diameter, weight 110 lbs. ... $45 00

No. 405. Champion Steel Tool Makers' Forge, with half hood, hearth 24x24 inches, height 30 inches, fan 9 inches in diameter, weight 120 lbs. 49 00



No. 404. With Shield.



No. 406. With Shield.

THE CHAMPION STEEL BOILER MAKERS' FORGE.

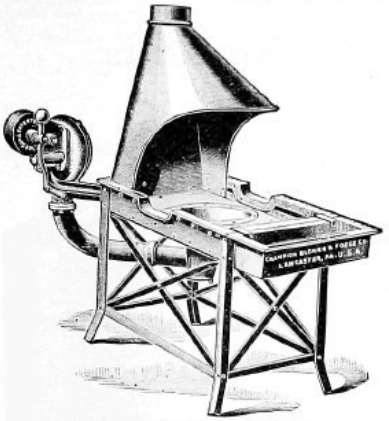
Made with Adjustable Ball Bearings Only.

No. 406. Champion Steel Boiler Makers' Forge, with shield, hearth 30x30 inches, height 30 inches, fan 10 inches in diameter, weight 160 lbs. $55 00

With water tank, extra 5 00

No. 407. Champion Steel Machinists' Forge, with half hood, hearth 30x30 inches, height 30 inches, fan 10 inches diameter, weight 175 lbs., 60 00

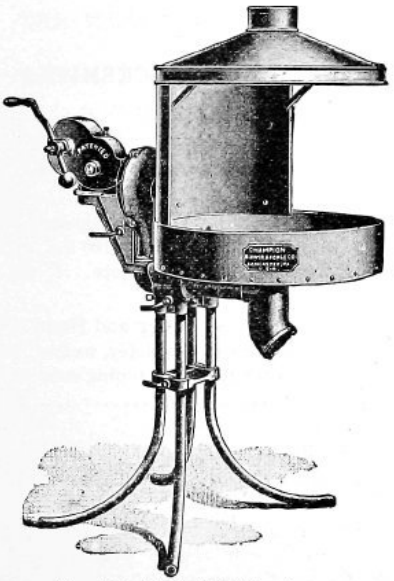
With water tank, extra 5 00



No. 408. With Half Hood.

STEEL HORSESHOERS' FORGE WITH FULL HOOD.

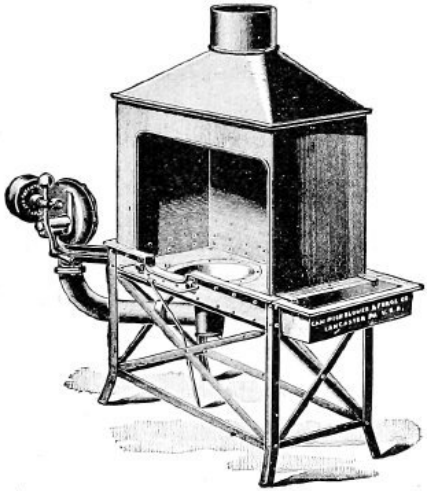
No. 408½. Champion Steel Horseshoers' Forge, with full hood, hearth 30x36 inches, height 30 inches, fan 12 inches in diameter, weight 250 lbs..... $80 00
With water tank, extra..... 5 00



No. 402. With Half Hood.

STEEL HORSESHOERS' FORGE.

No. 408. Champion Steel Horseshoers' Forge, with half hood, hearth 30x36 inches, height 30 inches, fan 12 inches in diameter, weight 225 lbs..... $65 00
With water tank, extra..... 5 00
No. 409. Champion Steel Blacksmiths' Forge, hearth 30x40 inches, height 30 inches, fan 12 inches in diameter, weight 250 lbs..... 70 00
With water tank, extra..... 5 00



No. 408½. With Full Hood.

THE CHAMPION STEEL TOOLMAKERS' FORGE.

Made with Adjustable Ball Bearings Only.

No. 402. Champion Steel Toolmakers' Forge, with half hood, hearth 18 inches diameter, height 30 inches, fan 9 inches diameter, weight 90 lbs..... $38 00
No. 403. Champion Steel Toolmakers' Forge, with closed hood, for use where combustible material is kept, hearth and fan are same as No. 402, weight 100 lbs..... 40 00

RAILROAD AND BRIDGE BUILDERS' LEVER FORGES.

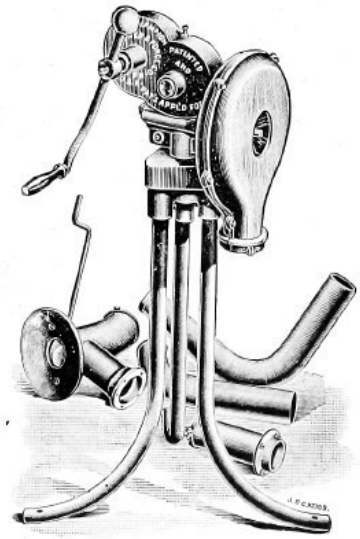
No. 9. With Galvanized Iron Drum and Shield.

These Forges are specially designed for Bridge and Tank Builders. They are made of the best material, and capable of the roughest kind of handling.

No. 9. Drum Railroad and Bridge Builders' Lever Forge, hearth 18 inches in diameter, height 30 inches, fan 9 inches, weight 115 lbs.....$32 00

No. 9½. Railroad and Bridge Builders' Improved Bellows Forge, hearth 19 inches in diameter, height of fireplace 30 inches, weight 100 lbs..... 32 00

No. 9½. Portable Bellows Forge.



The Famous No. 400.

CHAMPION STEEL BLACKSMITHS' BLOWER.

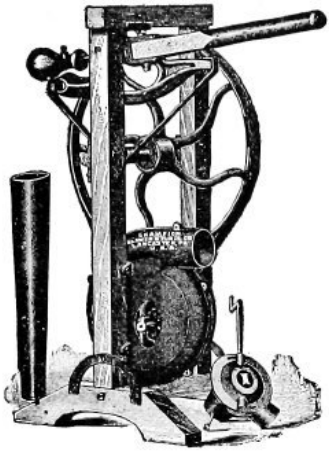
Made with Adjustable Ball Bearings Only.

No. 400. Champion Steel Blacksmiths' Blower, fan 12 inches in diameter, weight 100 lbs., with tuyere iron and piping complete.....$37 00

No. 400½. Champion Steel Power and Hand Blower, fan 12 inches in diameter, weight 115 lbs., with tuyere iron and piping complete..... 48 50

Counter Shaft with tight and loose pulley for shops equipped with power, extra..... 12 00

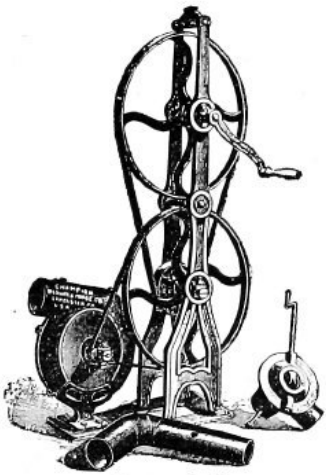
THE CHAMPION LEVER BLACKSMITHS' BLOWER.



Fan 16 inches and fly wheel 28 inches in diameter, has the capacity of a 50 inch bellows. Price complete, with patent adjustable nozzle tuyere iron and piping.....$12 00

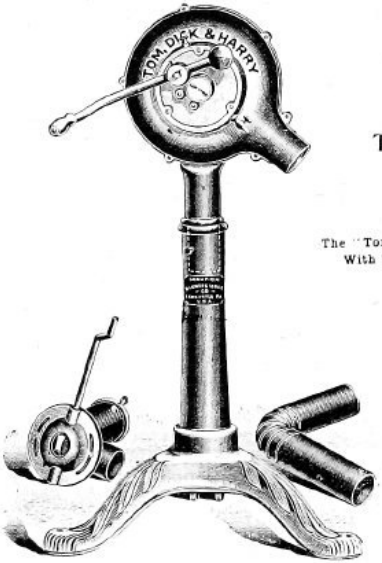
EVERY BLOWER WARRANTED.

THE CHAMPION NEW IMPROVED CENTENNIAL CRANK BLOWER.



The Champion New Improved Centennial Crank Blower, complete, with tuyere iron and piping, weight 180 lbs.....$20 00

The Old Style Centennial Crank Blower, with 16 inch fan and ball tuyere iron and piping, weight 165 lbs..... 15 00



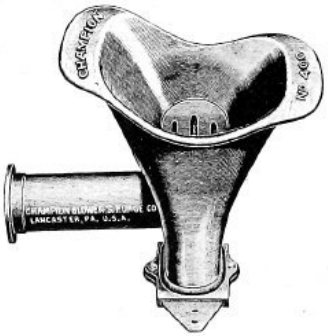
THE "TOM, DICK AND HARRY"

The "Tom, Dick and Harry" Cog-Geared Blower. Fan 12 Inches. With Tuyere Iron and Piping Complete. Weight 75 lbs. . . . $12.50

THE CHAMPION BLOWER.

This Blower is intended for blowing fires in portable and small stationary boilers, also for forge fires and various purposes where a small current of air is desired.

No. 0 Champion Blower. 10 In. High. Will blow one fire, ... $8.00
No. 00 Champion Blower. 14 In. High. Will blow two ordinary fires, 10.00
No. 000 Champion Blower. 16½ In. High. Will blow three ordinary fires, ... 12.00
Arranged for exhaust purposes, extra, ... 2.00

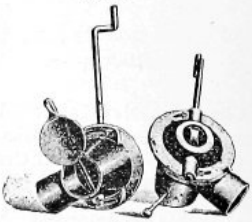


No. 400.

The Champion No. 400 Heavy Nest Tuyere Iron. Weight 70 lbs. Price, complete, ... $10.00

THE CHAMPION PATENT ADJUSTABLE NOZZLE TUYERE IRON.

Price, $2.00.



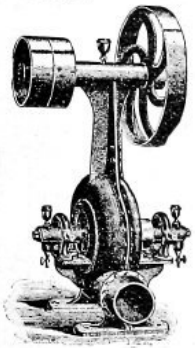
THE CHAMPION BALL TUYERE IRONS.

Price, $2.00.

THE CHAMPION
STEEL PRESSURE BLOWER.

For Cupola Forges and Furnaces.

Height in Inches.	No. of Blower.	Diameter of Pulley in Inches.	Face of Pulley in Inches.	Inside Diameter of Outlet.	Diameter in Inches Inside of Cupola.	Melting capacity per Hour in lbs.	Speed No. of Iron Melting Iron	Pressure of Blast in Ounces.	No. of Forge Fires.	Rev. per Minute for Forge Fires.	Price without Counter-shaft.
12	½	12	3½	5	.....	.....	.....	.....	1	4,200	$12 00
15	1	15	3½	5	.....	.....	.....	.....	2	4,200	18 00
22	2	22	3½	6	.....	.....	.....	.....	4	4,000	26 00
24	3	24	3½	6	22	1,300	4,150	5	6	3,725	36 00
26	4	25	3½	6	26	2,000	3,780	6	9	3,103	44 00
30	5	27	3½	6	30	2,900	3,275	7	15	2,456	55 00
35	6	30	3½	6	35	4,000	3,050	8	18	2,224	70 00
40	7	33	3½	6	40	6,000	2,900	10	24	1,814	90 00
45	8	36	3½	6	46	8,600	2,820	12	30	1,619	115 00
52	9	40	3½	6	52	12,300	2,600	14	40	1,344	160 00
61	10	44	3½	6	60	16,500	2,270	15	52	1,200	225 00

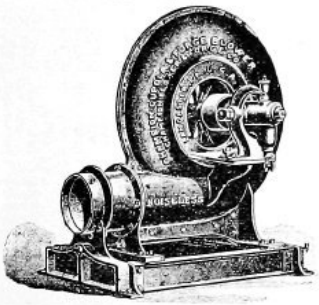


THE CHAMPION
STEEL PRESSURE BLOWER.

With Counter Shaft Cast to Shell of Case.

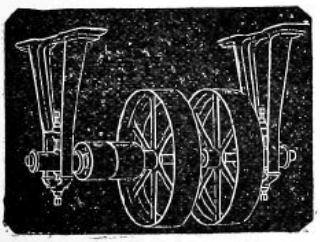
No. ½ Champion Steel Pressure Blower, 12 In. in Diameter, with Counter Shaft, ... $20.00

No. 1 Champion Steel Pressure Blower, 15 In. in Diam., ... 28.00



THE CHAMPION
STEEL PRESSURE BLOWER ON ADJUSTABLE BED.

No. of Blower.	Inside Diam. of Outlet in Inches.	Diameter of Pulley driving Blower.	Diam. of Pulley driven by Main Belt from Line Shaft.	Pulleys. Diameter in Inches.	Pulleys. Face in Inches.	Price with Belt without Countershaft.	Price with Belt and Countershaft.
6	7	30	10	6	4¾	$100.00	$135.00
7	8¾	32	12	6¾	5¾	130.00	175.00
8	10¾	36	14	8	6¾	170.00	230.00
9	11¾	40	16	9	8	265.00	350.00
10	13¾	44	18	10	9	330.00	435.00

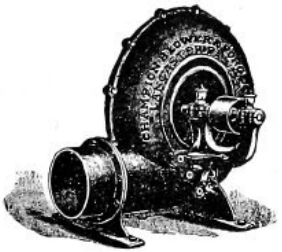


THE CHAMPION COUNTERSHAFT.

For Steel Pressure Blowers.

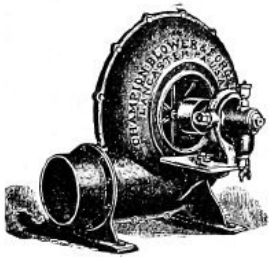
Size of Blower.	Diameter of Driving Pulley in Inches.	Diameter of Pulley for Main Belt in Inches.	Diameter of Shaft.	Price with Two Driving Pulleys, etc.	Price with One Driving Pulley.
½	12	4	1 7/16		$8 00
1	14	5	1 7/16		10 00
2	16	6	1 7/16		12 00
3	18	7	1 7/16		16 00
4	21	8	1 7/16	$25 00	20 00
5	26	9	1 7/16	30 00	25 00
6	30	10	1 7/16	35 00	30 00
7	32	12	2 7/16	45 00	40 00
8	36	14	2 7/16	60 00	50 00
9	40	16	2 7/16	80 00	70 00
10	44	18	3 7/16	100 00	90 00

THE CHAMPION EXHAUST FAN.



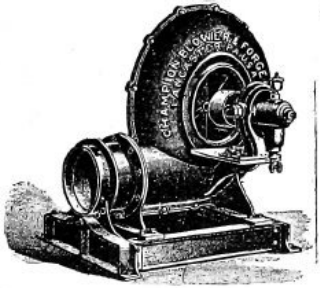
No. of Exhauster.	Price.	Height in Inches.	Inside Diameter of Inlet.	Inside Diameter of Outlet.	Diameter of Pulley.	Face of Pulley.	Revolutions per min. 2 oz. Blast for Boiler Fires.	Revolutions per min. 4 oz. Blast for Forge Fires.
½	$12.00	12	4½	3½	2¼	1½	3,300	4,500
1	15.00	15	5	4	2⅞	2	3,000	4,000
2	20.00	18	5½	4½	3	2½	2,600	3,600
3	25.00	21½	6½	5½	3¼	2½	2,300	3,200
4	33.00	25½	7½	7½	4¼	3½	1,928	2,682
5	44.00	29½	9	9	5⅛	4	1,638	2,279
6	55.00	34	10½	10½	6	4½	1,410	1,961
7	70.00	40	12	12	6¾	5½	1,194	1,662
8	90.00	45	14	14	8	6½	1,018	1,417
9	150.00	50	16	16	9	8	878	1,234
10	200.00	57	18	18	10	9	766	1,065

THE CHAMPION FAN BLOWER.



No. of Blower.	Price.	Height in inches.	Inside Diameter of Inlet.	Inside Diameter of Outlet.	Diameter of Pulley.	Face of Pulley.	Revs. per min. 2-ounce Blast for Boiler Fires.	Revs. per min. 4-ounce Blast for Forge Fires.	No. of Forge Fires.	Sq. ft. of Boiler, Grate Surface Supplied by Blower.
½	$12.00	12	4½	3½	2⅞	1¾	3,300	4,500	1	3½
1	15.00	15	5	4	3⅜	2	3,000	4,000	2	5
2	20.00	18	5½	4½	3⅞	2½	2,600	3,600	4	6
3	25.00	21½	6½	5½	4⅜	2½	2,300	3,200	6	8
4	33.00	25½	7½	7½	4⅞	3½	1,928	2,682	9	10
5	44.00	29½	9	9	5⅛	4	1,638	2,279	15	14
6	55.00	34	10½	10½	6	4½	1,410	1,961	18	20
7	70.00	40	12	12	6¾	5½	1,194	1,662	24	27
8	90.00	45	14	14	8	6½	1,018	1,417	30	36
9	150.00	50	16	16	9	8	878	1,234	40	48
10	200.00	57	18	18	10	9	766	1,065	52	62

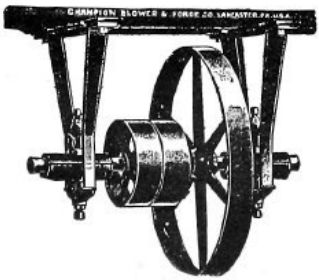
THE CHAMPION FAN BLOWER ON ADJUSTABLE BED.



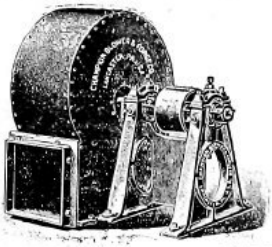
No. of Blower.	Inside Diam. of Outlet in Inches.	Diameter of Pulley driving Blower.	Diam. of Pulley Driven by Main Belt from Line Shaft.	Pulleys.		Price with Bed without Countershaft.	Price with Bed with Countershaft.
				Diameter in Inches.	Face in Inches.		
6	10½	30	10	6	4½	$90.00	$120.00
7	12	32	12	6¾	5½	115.00	160.00
8	14	36	14	8	6½	150.00	210.00
9	16	40	16	9	8	240.00	325.00
10	18	44	18	10	9	315.00	425.00

THE CHAMPION COUNTERSHAFT.

For Fan Blowers, Steel Plate Blowers and Exhaust Fans.

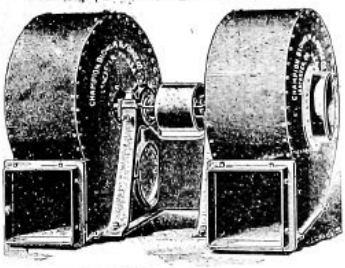


Size of Blower.	Diameter of Driving Pulley in Inches.	Diameter of Pulley for Main Belt in Inches.	Diameter of Shaft.	Price with one Driving Pulley.
½	12	4	⅞	$8.00
1	14	5	1	10.00
2	16	6	1⅛	12.00
3	18	7	1¼	14.00
4	21	8	1⅜	18.00
5	26	9	1½	24.00
6	30	10	1¾	30.00
7	32	12	2	40.00
8	36	14	2¼	50.00
9	40	16	2½	65.00
10	44	18	3	85.00



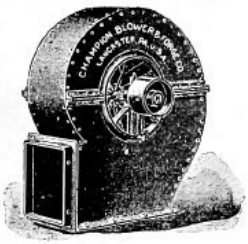
THE CHAMPION
PLANING MILL STEEL PLATE EXHAUST FAN.

Size.	Price.	Height of Shell.	Inside Diam. of Inlet.	Inside Diam. of Outlet.	Diam. and Face of Pulley.
30 inches.	$55.00	30 inches.	11 inches.	11 inches.	5½ x 5
35 "	70.00	35 "	13 "	13 "	6 x 6
40 "	90.00	40 "	15 "	14½ "	6½ x 6½
45 "	115.00	45 "	17 "	16½ "	8 x 7½
50 "	150.00	50 "	19 "	18½ "	8½ x 8½
55 "	185.00	55 "	21 "	20½ "	9½ x 9½
60 "	200.00	60 "	23 "	22½ "	10½ x 10



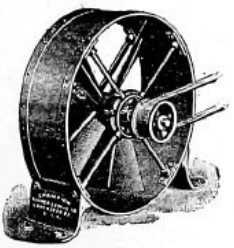
THE CHAMPION
DOUBLE PLANING MILL STEEL PLATE EXHAUST FAN

Size.	Price.	Height of Shell.	Inside Diam of Inlet.	Inside Diam. of Outlet.	Diam. and Face of Pulley
30 inches.	$90.00	30 inches.	11 inches.	11 inches.	6 x 6
35 "	100.00	35 "	13 "	13 "	7 x 7
40 "	130.00	40 "	15 "	14½ "	8 x 8
45 "	170.00	45 "	17 "	16½ "	9 x 9
50 "	210.00	50 "	19 "	18½ "	10 x 10½
55 "	275.00	55 "	21 "	20½ "	11 x 11
60 "	325.00	60 "	23 "	22½ "	12 x 11½



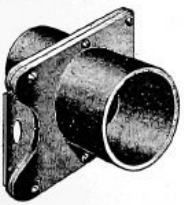
THE CHAMPION
STEEL PLATE BLOWER.

Height in Inches.	Inside Size of Outlet, in Inches.	Inside Diam. of Inlet.	Pulleys. Diam.	Pulleys. Face.	Average Speed.	Cap. Cu. ft. Air at 1 oz. Press.	Price.
50 in.	18½ x 18½	24½	9	7	693	11440	$125.00
60 "	22½ x 22½	26⅝	10	8	650	16120	175.00
70 "	26 x 26	34½	11	9	509	22880	225.00
80 "	29½ x 29½	39⅛	12	10	426	30160	275.00
90 "	33⅛ x 33⅛	43	14	11	376	39000	300.00
100 "	37½ x 37½	45¾	16	12	340	48360	400.00



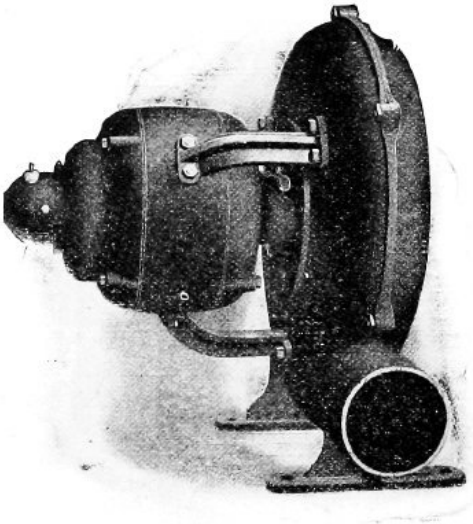
THE NEW CHAMPION DISC WHEEL.

Diameter of Wheel, Inch.	Price.	Diameter of Pulley.	Face of Pulley.	Diameter of Wheel, Inch.	Price.	Diameter of Pulley.	Face of Pulley.
18	$40 00	4	2	48	$125 00	9	4
24	50 00	4	2	54	175 00	9	4
30	65 00	6	2	60	250 00	10	5
36	85 00	7	3	72	300 00	12	5½
42	110 00	8	3½	84	350 00	14	6



THE CHAMPION BLAST GATE.

2	inch	Iron,	$1.00	10	inch	Iron,	5.00
2½	"	"	1.25	12	"	"	6.50
3½	"	"	1.50	14	"	"	8.00
4½	"	"	2.00	16	"	"	12.00
5	"	"	2.25	18	"	"	16.00
6½	"	"	2.50	20	"	"	18.00
8½	"	"	3.50	24	"	"	21.00



MOTOR DIRECT CONNECTED TO FORGE BLOWER.

These Motors are wound for 110 volts, 220 volts and 500 volts, and prices include automatic release starter.

Cut shows DUST PROOF MOTOR, direct connected to Forge Blower.

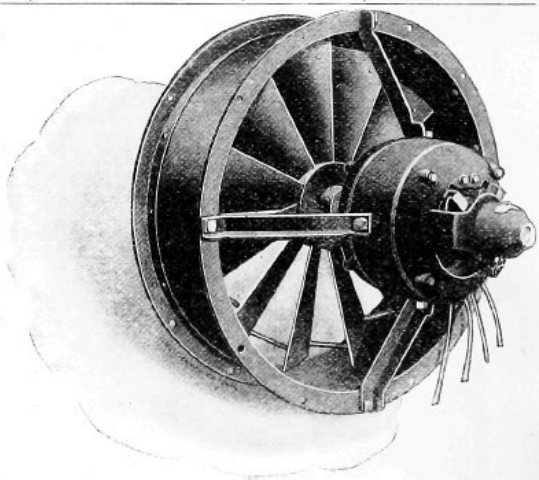
These Forge Blowers are furnished with the standard open type Motors unless otherwise ordered.

Size.	Outside Diameter of Outlet.	Outside Diameter of Inlet.	Height.	H. P.	R. P. M.	Price.
1	2¾ in.	3⅝ in.	10 in.	¼	2200	$ 85 00
2	4⅛ "	4⅞ "	15 "	⅓	2000	93 00
3	4¾ "	5¾ "	18 "	½	1800	120 00
4	4⅞ "	6½ "	20 "	¾	1800	172 00
5	7½ "	7½ "	24 "	1	1600	203 00

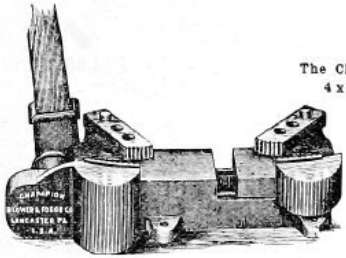
WATSON MOTOR DIRECT CONNECTED TO VENTILATING FAN.

These outfits are furnished complete with fan controllers with automatic releases. The following is a list of sizes we are prepared to furnish for either 110 volts, 220 volts or 500 volts:

Size.	H. P.	R. P. M.	Cubic Ft. of Air per Minute.	Price.
18 in.	½	1000	3600	$142 00
24 "	¾	800	6000	176 00
30 "	1	800	10000	213 00
36 "	2	800	15000	392 00

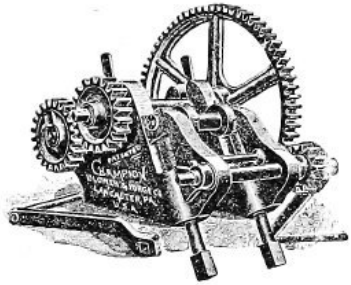


THE CHAMPION TIRE SHRINKER.



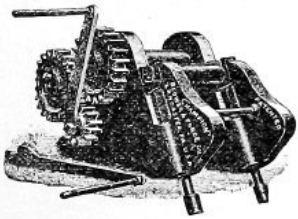
The Champion Tire Shrinker. Weight 140 lbs., will Shrink Tire 4 x 1 In., will Shrink Axles 1¼ x 1¼ In., Floor Space 18 x 10 In., $12.00

THE CHAMPION NEW PATENT EUREKA TIRE BENDER.



No. 1 New Style Eureka Bender, bends 4 x 1-In. Tire, $18.00
No. 2 New Style Eureka Bender, bends 6 x 1-In. Tire, 00

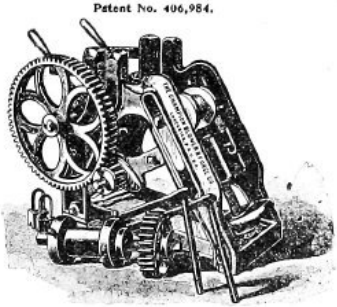
THE CHAMPION NEW PATENT TIRE BENDER.



The Champion New Patent Tire Bender., $11.00

THE CHAMPION "COLUMBIAN" TIRE BENDER.

Patent No. 406,984.

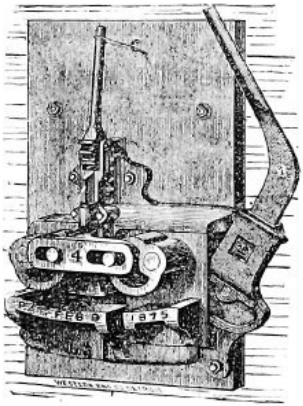


Extra Heavy Columbian Bender, Capacity 6 x 1 In. $50.00
No. 1 Columbian Bender, Capacity 5 x 1 In. 40.00
No. 2 Columbian Bender, Capacity 4 x 1 In., 34.00

THE CHAMPION OLD STYLE EUREKA TIRE BENDER.

No. 1 Old Style Eureka Bender, bends 4 x 1 In. $18.00
No. 2 Old Style Eureka Bender, bends 6 x 1 In., 25.00

Lightning Tire Upsetters.



PRICES:

No. 1 is a 2-inch Machine, - - $14.00
Will upset a tire from ¾ to ⅞ inch thick, and any width up to two inches.

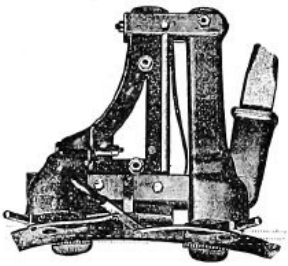
No. 2 is a 4-inch Machine, 22.50
Will upset any tire to four inches wide.

No. 3 is a "Special" 4-inch Machine, 26.00
Has sets of loose jaws. Can be adjusted for large and small circles, and also for upsetting axles up to 1¼ inches thick.

No. 4 is a 6-inch Machine, - - 36.00
This is for upsetting tires 6 inches wide.

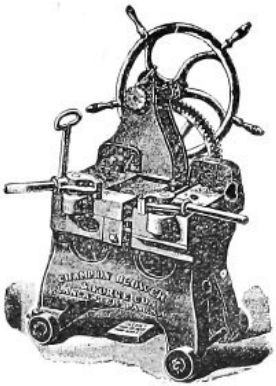
No. 5 is a "Special" 6-inch Machine, 45.00
Has two sets of loose jaws. Can be adjusted for large and small circles, and also for upsetting axles up to 2 inches thick. This is for upsetting tires 6 inches wide.

These Upsetters take the tire on the flat side, and have clamping head, as shown in cut, that prevents light tires from sinking.



THE LANCASTER
TIRE AND AXLE SHRINKER.

The Lancaster Tire and Axle Shrinker, $20.00



THE CHAMPION
"STAR" TIRE AND AXLE-UPSETTER
AND WELDING MACHINE.

No. 1, upsets or welds tire from ¾ to 5 x 1¼ Inches; upsets or welds axles, ¾ to 2½ Inches; upsets with one revolution, 2 Inches; weight 900 lbs., ... $100.00

No. 2, upsets or welds tire from ¾ to 7 x 1½ Inches; upsets or welds axles, ¾ to 3½ Inches; upsets with one revolution, 2 Inches; weight 1,200 lbs., ... 125.00

HAND LEVER PUNCHES AND SHEARS.

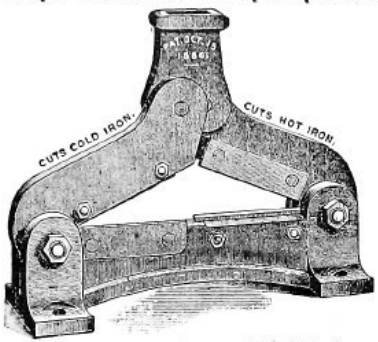
No. 3½

In response to a large number of calls from the public for a machine that will punch a 1-2 inch hole through 3-8 inch iron, we have successfully designed and built our No. 3½. In appearance it is the same as No. 1½, except heavier. Will punch 1-2 inch hole in 3-8 inch iron, 9-16 inch hole in 5-16 inch iron, and 5-8 inch hole in 1-4 inch iron, 4 1-2 inches from edge. We furnish 1-2 inch, 7-16 inch, and 3-8 inch dies with punches to match with each machine, unless otherwise ordered. **Price, $50 00**

Extra Punches, each..... 80

Extra Dies, each..... 1 20

The Detroit Iron Shears



is a powerful but simple compound lever machine, made especially for use of shops and merchants who have occasion to cut iron bars. It will cut 7-8 inch round or square bar, and 4x½ inch, cold. Hot up to 2½ inch or 4x1½ inch. We furnish a lever end to fit the socket, on which a bar can be welded for a handle.

Price, $25 00

IMPROVED COMBINED PUNCH AND SHEARS.

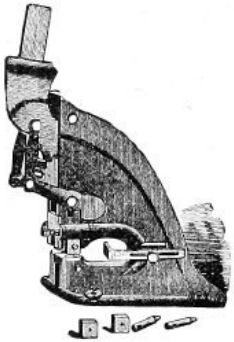
For a general line of light and heavy sheet-iron workers, etc. Adapted to punch flange and angle iron, and 8, 10, 12 and 18-inch blades to cut round or flat bar-iron and sheets as desired up to three eighth plates

The lever on the punch will work from the front or rear. The lever socket on the shears has a series of holes for adjusting the knife-bar links so as to cut but half the length of the blades, which increases the power from 50 to 100 per cent.

With the Punch are furnished three sets of punches and dies, back gauge, our improved side pin gauge for punching holes of equal distance apart without marking off, and strengthening bolts for deep throat Punches.

No.	Price, Each.	Depth of Throat.	Capacity to Punch.	Blades.	Cuts Sheets.	Cuts Bars, Inches.	Cuts Rounds, Inches.	Weight, Lbs.
2	40.00	4 Inch.	¼ in. ¼ in.	10 Inch.	No. 12,	¾ x 1	⅜	240
3	45.00	6 "	5/16 in. ¼ in.	10 "	" 10,	¼ x 1½	½	300
4	60.00	10 "	5/16 in. ¼ in.	15 "	" 8,	¾ x 2	⅝	450
5	60.00	12 "	⅜ in. ⅜ in.	12 "	" 6,	⅜ x 2	⅝	525
6	70.00	8 "	⅜ in. ⅜ in.	12 "	" 6,	½ x 2½	¾	640
8	80.00	12 "	⅜ in. ½ in.	12 "	¼ inch.	½ x 3	¾	800
10	95.00	18 "	¼ in. ¼ in.	18 "	No. 10,	½ x 2½	⅝	1,050
10-A	105.00	15 "	⅜ in. ⅜ in.	15 "	" 6,	½ x 3	¾	1,150
11	115.00	15 "	½ in. ½ in.	12 "	5/16 inch.	⅝ x 2½	⅞	1,200
11-B	122.00	12 "	⅝ in. ½ in.	10 "	⅜ "	⅝ x 3	⅞	1,275

HAND LEVER PUNCHES.



No. O.

Will punch 1-4 inch hole in 1-8 inch iron, 2 1-4 inches from edge to centre of hole. Will furnish 1-8, 3-16, and 1-4 inch die plate, with each machine. **Price, $10 00**

Extra Punches, each..... 35

Extra Punch Blocks, 3 holes, each..... 45

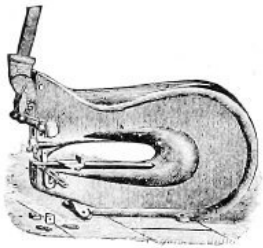
No. 1.

Will punch 3-16 inch hole in 3-16 inch iron, 5-16 in 1-8 inch iron, or 1-2 inch in No. 14 wire gauge; 3 inches from edge. Will furnish 1-8, 3-16, or 1-4 dies and punches to match with each Machine, unless otherwise ordered.

Price, $15 00

Extra Punch and Punch Blocks, each..... 45

ALL WEARING PARTS MADE OF BEST STEEL.



No. 2.

expressly made for Tin Shops and Sheet Iron workers generally. Will punch 3-16 inch hole in 3-16 inch iron, 5-16 inch in 1-8 inch, or 1-2 inch in No. 14 wire gauge; 13½ inches from edge. It has two gauges, one for gauging holes same distance apart. Will furnish 1-8, 3-16, and 1-4 inch dies, with punches to match, with each machine.

Price, $25 00

Punches and Punch Blocks, each..... 45

No. 1½

is especially adapted for blacksmiths, punching steel tire and heavy work in general. Will punch 3-8 inch hole in 1-4 inch iron, 5-8 inch hole in 3-16 inch iron, or 3-4 inch hole in 1-8 inch plate, 4 inches from edge. We furnish 1-4, 5-16 and 3-8 inch die plates, with punches to match, with each Machine.

Price, $20 00

Extra Punches, from 3-16 to 1-2, each..... 60

Extra Punches, from 5-8 to 1, each..... 70

Extra Punch Blocks, each..... 1 00

ALL WE ASK IS A TRIAL.

No. 2½.

Will punch 10½ inches from edge. *It has only a 36 inch lever.* Will punch 3-8 inch hole in 3-16 inch iron, 5-16 inch hole in 1-4 inch iron, and 1-2 inch hole in 1-8 inch iron, or 3-8 inch hole in 1-8 inch steel. Furnish 3-16, 1-4 and 5-16 dies with punches to match with each machine unless otherwise ordered.

Price, $40 00

Extra Punches and Punch Blocks, each.....

No. 106

TAPER SHANK DRILLS.

Diam.	Price Each.	Length.	Socket.
No. 1, American.	$0.45	5 1/8	No. 1, Morse.
	.45	5 3/16	
	.50	5 1/4	
	.55	5 5/16	
	.60	6 1/8	
	.65	6 1/4	
	.70	6 3/8	
	.75	6 1/2	
	.80	6 5/8	
	.85	7	
	.90	7 1/4	
	.95	7 1/2	
No. 2 American.	1.00	7 3/4	
	1.10	8	
	1.20	8 1/4	
No. 3 American.	1.30	8 1/2	No. 2, Morse.
	1.40	8 3/4	
	1.50	9	
	1.60	9 1/4	
	1.70	9 1/2	
No. 4, American.	1.85	9 3/4	
	2.00	9 7/8	
	2.15	0	
	2.30	10 1/4	
	2.45	10 5/8	
	2.60	10 5/8	
	2.75	10 3/4	No. 3, Morse.
	2.90	10 7/8	
1	3.00	11	
1 1/32	3.20	11 1/8	
1 1/16	3.40	11 1/4	
1 3/32	3.60	11 1/2	
1 1/8	3.80	11 3/4	
1 5/32	4.00	11 7/8	
1 3/16	4.20	12	
1 7/32	4.40	12 1/8	
1 1/4	4.50	12 1/2	
No. 5, American. 1 9/32	4.65	14 1/8	No. 4, Morse.
1 5/16	4.80	14 1/4	
1 11/32	5.00	14 3/8	
1 3/8	5.20	14 1/2	

Diam.	Price Each.	Length.	Socket.
No. 5, American. 1 13/32	$5.40	14 5/8	No. 4, Morse. Discount changes at 1 1/2.
1 7/16	5.60	14 3/4	
1 15/32	5.80	14 7/8	
1 1/2	6.00	15	
1 17/32	6.30	15 1/8	
1 9/16	6.60	15 1/4	
1 19/32	6.90	15 3/8	
1 5/8	7.20	15 1/2	
1 21/32	7.50	15 5/8	
1 11/16	7.80	15 3/4	
1 23/32	8.10	15 7/8	
1 3/4	8.40	16	
1 25/32	8.60	16 1/8	
1 13/16	8.80	16 1/4	
1 27/32	9.00	16 3/8	
1 7/8	9.20	16 1/2	
1 29/32	9.35	16 1/2	
1 15/16	9.50	16 1/2	
1 31/32	9.65	16 1/2	
2	9.80	16 1/2	
No. 6, American. 2 1/32	10.20	16 1/2	No. 5, Morse.
2 1/16	10.60	17	
2 1/8	11.20	17	
2 3/16	12.00	17	
2 1/4	12.80	17 1/2	
2 5/16	13.60	17 1/2	
2 3/8	14.40	18	
2 7/16	15.00	18 1/2	
2 1/2	15.60	19	
2 9/16	16.20	19 1/4	
2 5/8	16.80	19 1/2	
2 11/16	17.60	20	
2 3/4	19.00	20 1/2	
2 13/16	20.00	20 1/2	
2 7/8	21.00	21	
2 15/16	23.00	21	
3	25.00	21	

Drills of any size or length, with Taper or Straight Shanks, made to order, and to fit any socket desired.
In ordering special Tapers give the length of Shank and Diameter at each end of it.
When ordering drills over 3 inches in diameter, specify size of shank wanted.

ALWAYS GIVE LIST NUMBER WHEN ORDERING.

NO. 110

STRAIGHT SHANK DRILLS.

Same Length as Taper Shanks.

Diameter	Price Each.	Length.	Diameter.	Price Each.	Length.
1/16	$0.35	3 5/8	1 3/16	$ 4.20	12
1/32	.35	4 5/8	1 7/32	4.40	12 1/4
1/8	.45	5 1/8	1 1/4	4.50	12 1/2
5/32	.45	5 3/8	1 9/32	4.65	14 1/8
3/16	.50	5 5/8	1 5/16	4.80	14 1/4
7/32	.55	5 7/8	1 11/32	5.00	14 3/8
1/4	.60	6 1/8	1 3/8	5.20	14 1/2
9/32	.65	6 1/4	1 13/32	5.40	14 5/8
5/16	.70	6 3/8	1 7/16	5.60	14 3/4
11/32	.75	6 1/2	1 15/32	5.80	14 7/8
3/8	.80	6 3/4	1 1/2	6.00	15
13/32	.85	7			
7/16	.90	7 1/4	1 17/32	6.30	15 1/8
15/32	.95	7 1/2	1 9/16	6.60	15 1/4
1/2	1.00	7 3/4	1 19/32	6.90	15 3/4
17/32	1.10	8	1 5/8	7.20	15 1/2
9/16	1.20	8 1/4	1 21/32	7.50	15 5/8
19/32	1.30	8 1/2	1 11/16	7.80	15 3/4
			1 23/32	8.10	15 7/8
5/8	1.40	8 3/4	1 3/4	8.40	16
21/32	1.50	9	1 25/32	8.60	16 1/8
11/16	1.60	9 1/4	1 13/16	8.80	16 1/4
23/32	1.70	9 1/2	1 27/32	9.00	16 3/8
3/4	1.85	9 3/4	1 7/8	9.20	16 1/2
25/32	2.00	9 7/8	1 29/32	9.35	16 1/2
13/16	2.15	10	1 15/16	9.50	16 1/2
27/32	2.30	10 1/4	1 31/32	9.65	16 1/2
7/8	2.45	10 1/2			
29/32	2.60	10 5/8	2	9.80	16 1/2
			2 1/32	10.20	16 1/2
15/16	2.75	10 3/4	2 1/16	10.60	17
31/32	2.90	10 7/8	2 1/8	11.20	17
1	3.00	11	2 3/16	12.00	17
1 1/32	3.20	11 1/8	2 1/4	12.80	17 1/2
1 1/16	3.40	11 1/4	2 5/16	13.60	17 1/2
1 3/32	3.60	11 1/2	2 3/8	14.40	18
1 1/8	3.80	11 3/4	2 7/16	15.00	18 1/2
1 5/32	4.00	11 7/8	2 1/2	15.60	19

Discount change at 1 1/2.

Drills over 2 1/2" take same list as Taper Shank No. 106.

NO. 108.

STRAIGHT SHANK DRILLS.

Diameter.	Price per Dozen.	Price Each.	Length in Inches.
1/16	$1.00	$0.09	2 1/2
5/64	1.10	.10	2 5/8
3/32	1.20	.11	2 3/4
7/64	1.30	.12	2 7/8
1/8	1.45	.13	3
9/64	1.60	.15	3 1/8
5/32	1.80	.16	3 1/4
11/64	2.00	.18	3 3/8
3/16	2.20	.20	3 1/2
13/64	2.40	.21	3 5/8
7/32	2.65	.23	3 3/4
15/64	2.90	.26	3 7/8
1/4	3.15	.28	4
17/64	3.40	.30	4 1/8
9/32	3.65	.32	4 1/4
19/64	3.90	.35	4 3/8
5/16	4.20	.37	4 1/2
21/64	4.50	.40	4 5/8
11/32	4.80	.42	4 3/4
23/64	5.10	.45	4 7/8
3/8	5.40	.48	5
25/64	5.70	.50	5 1/8
13/32	6.00	.53	5 1/4
27/64	6.40	.55	5 3/8
7/16	6.80	.59	5 1/2
29/64	7.20	.63	5 5/8
15/32	7.50	.65	5 3/4
31/64	7.75	.67	5 7/8
1/2	8.00	.70	6

NO. 108—A.

STRAIGHT SHANK DRILLS.

Number by Gauge	Price per Dozen.	Price Each.	Decimals of 1 inch.	Length, Inches	Number by Gauge.	Price per Dozen.	Price Each.	Decimals of 1 inch.	Length, Inches.
1	$2.35	$0.22	.2280	4	41	$1.10	$0.10	.0960	2 5/16
2	2.35	.22	.2210	3 15/16	42	1.10	.10	.0935	2 5/16
3	2.35	.22	.2130	3 15/16	43	1.10	.10	.0890	2 1/4
4	2.35	.22	.2090	3 1/4	44	1.10	.10	.0860	2 3/16
5	2.35	.22	.2055	3 13/16	45	1.10	.10	.0820	2 3/16
6	2.25	.21	.2040	3 13/16	46	.95	.09	.0810	2 1/8
7	2.25	.21	.2010	3 3/4	47	.95	.09	.0785	2 1/16
8	2.25	.21	.1990	3 11/16	48	.95	.09	.0760	2 1/16
9	2.25	.21	.1960	3 11/16	49	.95	.09	.0730	2
10	2.25	.21	.1935	3 5/8	50	.95	.09	.0700	1 15/16
11	2.10	.20	.1910	3 9/16	51	.95	.09	.0670	1 15/16
12	2.10	.20	.1890	3 9/16	52	.95	.09	.0635	1 7/8
13	2.10	.20	.1850	3 1/2	53	.95	.09	.0595	1 13/16
14	2.10	.20	.1820	3 7/16	54	.95	.09	.0550	1 13/16
15	2.10	.20	.1800	3 7/16	55	.95	.09	.0520	1 3/4
16	1.95	.19	.1770	3 3/8	56	.95	.09	.0465	1 11/16
17	1.95	.19	.1730	3 5/16	57	.95	.09	.0430	1 11/16
18	1.95	.19	.1695	3 5/16	58	.95	.09	.0420	1 5/8
19	1.95	.19	.1660	3 1/4	59	.95	.09	.0410	1 9/16
20	1.95	.19	.1610	3 3/16	60	.95	.09	.0400	1 9/16
21	1.75	.17	.1590	3 3/16	61	.90	.08	.039	1 1/2
22	1.75	.17	.1570	3 1/8	62	.90	.08	.038	1 1/2
23	1.75	.17	.1540	3 1/16	63	.90	.08	.037	1 1/2
24	1.75	.17	.1520	3 1/16	64	.90	.08	.036	1 1/2
25	1.75	.17	.1495	3	65	.90	.08	.035	1 1/2
26	1.55	.15	.1470	2 15/16	66	.90	.08	.033	1 1/2
27	1.55	.15	.1440	2 15/16	67	.90	.08	.032	1 7/16
28	1.55	.15	.1405	2 7/8	68	.90	.08	.031	1 7/16
29	1.55	.15	.1360	2 13/16	69	.90	.08	.02925	1 3/8
30	1.55	.15	.1285	2 13/16	70	.90	.08	.028	1 5/16
31	1.40	.14	.1200	2 5/8	71	1.00	.09	.026	1 5/16
32	1.40	.14	.1160	2 1/16	72	1.00	.09	.025	1 1/4
33	1.40	.14	.1130	2 1/16	73	1.00	.09	.024	1 3/16
34	1.40	.14	.1110	2 5/8	74	1.00	.09	.0225	1 1/8
35	1.40	.14	.1100	2 9/16	75	1.00	.09	.021	1 1/16
36	1.25	.12	.1065	2 9/16	76	1.00	.09	.020	1
37	1.25	.12	.1040	2 1/2	77	1.00	.09	.018	15/16
38	1.25	.12	.1015	2 7/16	78	1.00	.09	.016	7/8
39	1.25	.12	.0995	2 7/16	79	1.00	.09	.0145	13/16
40	1.25	.12	.0980	2 3/8	80	1.00	.09	.0135	3/4

No. 111.

SQUARE SHANK RATCHET DRILLS.

Diameter.	Price Each.	Length.	Diameter.	Price Each.	Length.
1/4	$1.00	5 inch.	1	$2.55	8 1/2 inch.
9/32	1.05	5 "	1 1/32	2.70	8 1/2 "
5/16	1.10	5 "	1 1/16	2.85	8 1/2 "
11/32	1.15	5 "	1 3/32	3.00	8 1/2 "
3/8	1.20	6 "	1 1/8	3.10	9 "
13/32	1.25	6 1/4 "	1 5/32	3.25	9 "
7/16	1.25	6 1/4 "	1 3/16	3.35	9 "
15/32	1.30	6 1/4 "	1 7/32	3.50	9 "
1/2	1.30	6 1/2 "	1 1/4	3.65	9 "
17/32	1.35	6 1/2 "	1 9/32	3.75	9 "
9/16	1.35	6 1/2 "	1 5/16	3.90	9 "
19/32	1.40	6 1/2 "	1 11/32	4.05	9 "
5/8	1.40	6 1/2 "	1 3/8	4.20	9 "
21/32	1.45	6 1/2 "	1 13/32	4.35	9 "
11/16	1.45	6 1/2 "	1 7/16	4.50	9 "
23/32	1.50	6 1/2 "	1 15/32	4.65	9 "
3/4	1.55	6 1/2 "	1 1/2	4.80	9 "
25/32	1.65	6 1/2 "	1 9/16	5.10	10 "
13/16	1.75	7 "	1 5/8	5.40	10 "
27/32	1.90	7 "	1 11/16	5.75	10 "
7/8	2.05	7 1/2 "	1 3/4	6.10	10 "
29/32	2.20	7 1/2 "	1 13/16	6.50	10 "
15/16	2.30	8 "	1 7/8	6.90	10 "
31/32	2.40	8 "	1 15/16	7.30	10 "
			2	7.75	11 "

No. 1 Shanks are 5/8 in. by 3/8 in. by 1 1/2 long.
No. 2 Shanks are 3/4 in. by 1/2 in. by 1 3/4 long.
When ordering taper square shank drills for Ratchets, please state number of ratchet and manufacturer

No. 116

DRILLS FOR BLACKSMITHS' DRILL PRESSES.

SHANKS ARE .648--EXACT DIAMETER--COMMONLY CALLED $\frac{5}{8}$.

Diameter.	Price Each.	Length.	Diameter.	Price Each.	Length.
$\frac{1}{8}$	$0.55	$4\frac{7}{8}$ inch.	$\frac{31}{32}$	$1.70	6 inch.
$\frac{5}{32}$	.58	$4\frac{7}{8}$ "	1	1.80	6 "
$\frac{3}{16}$	.60	$5\frac{5}{8}$ "	$1\frac{1}{32}$	1.90	6 "
$\frac{7}{32}$	.65	$5\frac{5}{8}$ "	$1\frac{1}{16}$	2.00	6 "
$\frac{1}{4}$	.70	6 "	$1\frac{3}{32}$	2.10	6 "
$\frac{9}{32}$	.73	6 "	$1\frac{1}{8}$	2.20	6 "
$\frac{5}{16}$	.75	6 "	$1\frac{5}{32}$	2.25	6 "
$\frac{11}{32}$	.80	6 "	$1\frac{3}{16}$	2.30	6 "
$\frac{3}{8}$	.85	6 "	$1\frac{7}{32}$	2.35	6 "
$\frac{13}{32}$	.88	6 "	$1\frac{1}{4}$	2.40	6 "
$\frac{7}{16}$	.90	6 "	$1\frac{9}{32}$	2.50	6 "
$\frac{15}{32}$	.93	6 "	$1\frac{5}{16}$	2.60	6 "
$\frac{1}{2}$	.95	6 "	$1\frac{11}{32}$	2.70	6 "
$\frac{17}{32}$	.98	6 "	$1\frac{3}{8}$	2.80	6 "
$\frac{9}{16}$	1.00	6 "	$1\frac{13}{32}$	2.90	6 "
$\frac{19}{32}$	1.03	6 "	$1\frac{7}{16}$	3.00	6 "
$\frac{5}{8}$	1.05	6 "	$1\frac{15}{32}$	3.10	6 " Discount changes at $1\frac{1}{2}$.
$\frac{21}{32}$	1.10	6 "	$1\frac{1}{2}$	3.20	6 "
$\frac{11}{16}$	1.15	6 "			
$\frac{23}{32}$	1.20	6 "	$1\frac{9}{16}$	3.40	6 "
$\frac{3}{4}$	1.25	6 "	$1\frac{5}{8}$	3.60	6 "
$\frac{25}{32}$	1.30	6 "	$1\frac{11}{16}$	3.80	6 "
$\frac{13}{16}$	1.35	6 "	$1\frac{3}{4}$	4.05	6 "
$\frac{27}{32}$	1.40	6 "	$1\frac{13}{16}$	4.30	6 "
$\frac{7}{8}$	1.45	6 "	$1\frac{7}{8}$	4.50	6 "
$\frac{29}{32}$	1.55	6 "	$1\frac{15}{16}$	4.75	6 "
$\frac{15}{16}$	1.60	6 "	2	5.00	6 "

The above Drills have Shanks $2\frac{1}{4}$ inches long, and .648 inch diameter.

NO. 120.

DRILLS FOR BLACKSMITHS' DRILL PRESSES.

Diameter.	Price Each.	Length.	Diameter.	Price Each.	Length.
1/8	$0.45	4 7/8 inch.	27/32	$1.40	6 inch.
5/64	.45	4 7/8 "	7/8	1.45	6 "
3/16	.50	5 5/8 "	29/32	1.50	6 "
7/32	.55	5 5/8 "	15/16	1.60	6 "
1/4	.60	6 "	31/32	1.70	6 "
9/32	.65	6 "	1	1.80	6 "
5/16	.70	6 "	1 1/32	1.90	6 "
11/32	.73	6 "	1 1/16	2.00	6 "
3/8	.75	6 "	1 3/32	2.10	6 "
13/32	.78	6 "	1 1/8	2.20	6 "
7/16	.80	6 "	1 5/32	2.25	6 "
15/32	.83	6 "	1 3/16	2.30	6 "
1/2	.85	6 "	1 7/32	2.35	6 "
17/32	.88	6 "	1 1/4	2.40	6 "
9/16	.90	6 "	1 9/32	2.50	6 "
19/32	1.00	6 "	1 5/16	2.60	6 "
5/8	1.05	6 "	1 11/32	2.70	6 "
21/32	1.10	6 "	1 3/8	2.80	6 "
11/16	1.15	6 "	1 13/32	2.90	6 "
23/32	1.20	6 "	1 7/16	3.00	6 "
3/4	1.25	6 "	1 15/32	3.10	6 "
25/32	1.30	6 "	1 1/2	3.20	6 "
13/16	1.35	6 "			

The above Drills have Shanks 2 1/4 in. long, and 1/2 in. diameter.

NO. 114.

BIT STOCK DRILLS FOR METAL OR WOOD.

Diam.	Price per Doz.	Price Each.	Length.	Diam.	Price per Doz.	Price Each.	Length.
2/32	$1.50	$ .14	3 9/16	14/32	$ 8.80	$ .75	6 1/2
3/32	1.65	.16	4	15/32	9.60	.82	6 3/4
4/32	2.10	.20	4	16/32	10.30	.87	7
5/32	2.60	.24	4 1/4	17/32	11.00	.92	7 1/4
6/32	3.10	.29	4 1/2	9/16	14.35	1.20	7 1/2
7/32	3.60	.33	4 3/4	5/8	16.15	1.35	7 1/2
8/32	4.10	.38	5	11/16	17.95	1.50	7 1/2
9/32	4.70	.43	5 1/4	3/4	19.75	1.65	7 1/2
10/32	5.40	.48	5 1/2	13/16	21.55	1.80	7 1/2
11/32	6.30	.54	5 3/4	7/8	23.35	1.95	7 1/2
12/32	7.20	.62	6	15/16	25.75	2.15	7 1/2
13/32	8.00	.68	6 1/4	1	28.15	2.35	7 1/2

These drills are carried in stock, with diameters varying by 64ths.

☞These Drills are made of the finest Steel, and are tempered to drill steel, iron or wood. They will bore wood without splitting it.

NO. 114-A.

WOOD BITS FOR BRACE.

WE MAKE BUT ONE BRAND, AND THAT IS THE BEST.

THE NUMBERS INDICATE THE SIZES IN 32DS OF AN INCH

No.	Per Doz.	Each.	No.	Per Doz	Each.	No.	Per Doz.	Each.
2	$1.60	$0.15	11	$4.00	$0.35	19	$6.00	$0.55
3	1.60	.15	12	4.00	.35	20	6.00	.55
4	1.60	.15	13	4.50	.40	22	6.50	.60
5	1.75	.18	14	4.50	.40	24	7.00	.65
6	2.00	.20	15	5.00	.45	26	7.50	.70
7	2.50	.22	16	5.00	.45	28	8.00	.75
8	3.00	.25	17	5.50	.50	30	9.00	.85
9	3.50	.30	18	5.50	.50	32	10.00	.95
10	3.50	.30						

ALWAYS GIVE LIST NUMBER WHEN ORDERING.

SET NO. 13 B

WOOD BITS FOR BRACE.

A set of highest grade Wood Bits, comprising $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$.

These are contained in an elegant flat box, covered with dark green corduroy silk, and beautifully embossed in gold.

Size, $8\frac{3}{4}$ x $3\frac{1}{2}$ x $\frac{3}{4}$ inches.

It is just the thing to carry around in the coat pocket.

PRICE, COMPLETE, $1 90

SET NO. 14 B.

BIT STOCK DRILLS FOR METAL OR WOOD.

A set of the finest quality Bit Stock Drills, comprising $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$.

The handsome flat box that goes with this set is covered with a strong leatherette—green in color—gold embossed.

Size, 7 x $3\frac{1}{2}$ x $\frac{3}{4}$ inches.

These drills can be used to bore either metal or wood.

PRICE, COMPLETE, $2 65.

NO. 124.

MACHINE OR NUT TAPS.

Diameter.	Price Each.	Length.	Length of Thread.	No. Threads to Inch.	
$\frac{1}{4}$	$0.60	$5\frac{1}{2}$	$1\frac{1}{2}$	18	and 20
$\frac{5}{16}$	.70	6	$1\frac{3}{4}$	16	and 18
$\frac{3}{8}$	.80	$6\frac{1}{2}$	2	14	and 16
$\frac{7}{16}$	.90	7	$2\frac{1}{4}$	12, 14	and 16
$\frac{1}{2}$	1.00	$7\frac{1}{2}$	$2\frac{1}{2}$	12, 13	
$\frac{9}{16}$	1.15	8	$2\frac{3}{4}$	12	
$\frac{5}{8}$	1.30	$8\frac{1}{2}$	3	10, 11	
$\frac{11}{16}$	1.45	9	$3\frac{1}{4}$	11	
$\frac{3}{4}$	1.60	$9\frac{1}{2}$	$3\frac{1}{2}$	10	
$\frac{13}{16}$	1.80	10	$3\frac{3}{4}$	10	
$\frac{7}{8}$	2.10	$10\frac{1}{2}$	4	9	and 10
$\frac{15}{16}$	2.40	11	$4\frac{1}{4}$	9	
1	2.80	$11\frac{1}{2}$	$4\frac{1}{2}$	8	
$1\frac{1}{8}$	3.20	12	$4\frac{3}{4}$	7	and 8
$1\frac{1}{4}$	3.70	$12\frac{1}{2}$	5	7	and 8
$1\frac{3}{8}$	4.20	13	$5\frac{1}{4}$	6	
$1\frac{1}{2}$	4.70	$13\frac{1}{2}$	$5\frac{1}{2}$	6	
$1\frac{5}{8}$	5.30	14	$5\frac{3}{4}$	5	and $5\frac{1}{2}$
$1\frac{3}{4}$	6.00	$14\frac{1}{2}$	6	5	
$1\frac{7}{8}$	6.80	15	$6\frac{1}{4}$	$4\frac{1}{2}$	and 5
2	7.70	$15\frac{1}{2}$	$6\frac{1}{2}$	$4\frac{1}{2}$	Discount changes at 2″
$2\frac{1}{8}$	9.00	16	$6\frac{3}{4}$	$4\frac{1}{2}$	
$2\frac{1}{4}$	10.20	$16\frac{1}{2}$	7	$4\frac{1}{2}$	
$2\frac{3}{8}$	11.50	17	$7\frac{1}{4}$	4	
$2\frac{1}{2}$	12.50	$17\frac{1}{2}$	$7\frac{1}{2}$	4	
$2\frac{5}{8}$	14.00	18	$7\frac{3}{4}$	4	
$2\frac{3}{4}$	15.00	$18\frac{1}{2}$	8	4	
$2\frac{7}{8}$	16.50	19	$8\frac{1}{4}$	4	Discount changes at 3″
3	18.00	$19\frac{1}{2}$	$8\frac{1}{2}$	$3\frac{1}{2}$	
$3\frac{1}{8}$	20.00	20	$8\frac{3}{4}$	$3\frac{1}{2}$	
$3\frac{1}{4}$	21.50	20	9	$3\frac{1}{2}$	
$3\frac{3}{8}$	23.50	$20\frac{1}{2}$	$9\frac{1}{4}$	$3\frac{1}{2}$	
$3\frac{1}{2}$	25.00	$20\frac{1}{2}$	$9\frac{1}{2}$	$3\frac{1}{4}$	
$3\frac{5}{8}$	27.50	21	$9\frac{3}{4}$	$3\frac{1}{4}$	
$3\frac{3}{4}$	29.50	21	10	3	
$3\frac{7}{8}$	31.50	21	$10\frac{1}{4}$	3	
4	33.50	$21\frac{1}{2}$	$10\frac{1}{2}$	3	

In ordering please state whether U. S. Standard or V thread is required, and if exact size or $\frac{1}{32}$ over size.

All Taps furnished with V thread unless otherwise ordered.

No. 126.

THREE HAND TAPS IN A SET.

TAPER.

PLUG.

BOTTOMING

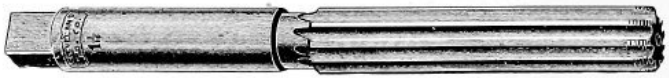
Size.	Length Over All.	Length Thread	No. of V Threads to Inch.	Price Each	Price per Set.
$\frac{1}{4}$	$2\frac{3}{4}$	1	20	$ .45	$ 1.35
$\frac{5}{16}$	3	$1\frac{1}{8}$	18	.50	1.50
$\frac{3}{8}$	$3\frac{1}{4}$	$1\frac{1}{4}$	16	.55	1.65
$\frac{7}{16}$	$3\frac{1}{2}$	$1\frac{3}{8}$	14	.60	1.80
$\frac{1}{2}$	$3\frac{3}{4}$	$1\frac{1}{2}$	12	.70	2.10
$\frac{9}{16}$	4	$1\frac{5}{8}$	12	.80	2.40
$\frac{5}{8}$	$4\frac{1}{4}$	$1\frac{3}{4}$	11	.90	2.70
$\frac{11}{16}$	$4\frac{1}{2}$	$1\frac{7}{8}$	11	1.05	3.15
$\frac{3}{4}$	$4\frac{3}{4}$	2	10	1.20	3.60
$\frac{13}{16}$	5	$2\frac{1}{8}$	10	1.40	4.20
$\frac{7}{8}$	$5\frac{1}{4}$	$2\frac{1}{4}$	9	1.60	4.80
$\frac{15}{16}$	$5\frac{1}{2}$	$2\frac{3}{8}$	9	1.80	5.40
1	$5\frac{3}{4}$	$2\frac{1}{2}$	8	2.00	6.00
$1\frac{1}{8}$	6	$2\frac{5}{8}$	7	2.25	6.75
$1\frac{1}{4}$	$6\frac{1}{4}$	$2\frac{3}{4}$	7	2.60	7.80
$1\frac{3}{8}$	$6\frac{1}{2}$	$2\frac{7}{8}$	6	3.00	9.00
$1\frac{1}{2}$	$6\frac{3}{4}$	3	6	3.50	10.50
$1\frac{5}{8}$	7	$3\frac{1}{8}$	5	4.20	12.60
$1\frac{3}{4}$	$7\frac{1}{4}$	$3\frac{1}{4}$	5	5.00	15.00
$1\frac{7}{8}$	$7\frac{1}{2}$	$3\frac{3}{8}$	5	5.80	17.40
2	$7\frac{3}{4}$	$3\frac{3}{8}$	$4\frac{1}{2}$	6.70	20.10

ALWAYS GIVE LIST NUMBER WHEN ORDERING.

No. 126

CLEVELAND SELF-FEEDING REAMER.

ECCENTRIC FLUTES.



Diameter.	Price Each.	Full Length.	Length of Flutes.	Diameter.	Price Each.	Full Length.	Length of Flutes.
1/8	$1.00	3	1 1/2	1 1/32	$5.40	12 7/32	6 7/64
5/32	1.10	3 1/4	1 5/8	1 3/8	5.60	12 5/8	6 5/16
3/16	1.20	3 1/2	1 3/4	1 1/32	5.80	12 23/32	6 23/64
7/32	1.30	3 3/4	1 7/8	1 7/16	6.00	12 1 3/16	6 1 3/32
1/4	1.40	4	2	1 1/32	6.20	12 25/32	6 25/64
9/32	1.45	4 1/4	2 1/8	1 1/2	6.40	13	6 1/2
5/16	1.50	4 1/2	2 1/4	1 1/32	6.60	13	6 1/2
11/32	1.55	4 3/4	2 3/8	1 9/16	6.80	13	6 1/2
3/8	1.60	5	2 1/2	1 1/32	7.00	13	6 1/2
13/32	1.70	5 1/4	2 5/8	1 5/8	7.20	13	6 1/2
7/16	1.75	5 1/2	2 3/4	1 21/32	7.40	13 1/2	6 3/4
15/32	1.85	5 3/4	2 7/8	1 11/16	7.60	13 1/2	6 3/4
1/2	1.90	6	3	1 23/32	7.80	13 1/2	6 3/4
17/32	1.95	6 1/4	3 1/8	1 3/4	8.00	13 1/2	6 3/4
9/16	2.00	6 1/2	3 1/4	1 25/32	8.20	13 1/2	6 3/4
19/32	2.10	6 3/4	3 3/8	1 13/16	8.40	13 1/2	6 3/4
5/8	2.20	7	3 1/2	1 27/32	8.60	13 1/2	6 3/4
21/32	2.30	7 1 1/32	3 43/64	1 7/8	8.80	14	7
11/16	2.40	7 1 1/16	3 27/32	1 29/32	9.00	14	7
23/32	2.50	8 1/8	4 1/16	1 15/16	9.20	14	7
3/4	2.60	8 3/8	4 3/16	1 31/32	9.40	14	7
25/32	2.70	8 23/32	4 25/64	2	9.60	14	7
13/16	2.80	9 1/16	4 1/32	2 1/16	10.00	14 1/2	7 1/4
27/32	2.95	9 3/8	4 1/16	2 1/8	10.40	14 1/2	7 1/4
7/8	3.10	9 1 1/16	4 27/32	2 3/16	10.80	15	7 1/2
29/32	3.25	10 3/32	5 3/64	2 1/4	11.30	15	7 1/2
15/16	3.40	10 1/4	5 1/8	2 5/16	11.80	15	7 1/2
31/32	3.55	10 1 1/16	5 11/32	2 3/8	12.30	15	7 1/2
1	3.70	10 7/16	5 7/16	2 7/16	12.80	15 1/2	7 3/4
1 1/32	3.85	11 1/16	5 17/32	2 1/2	13.40	15 1/2	7 3/4
1 1/16	4.00	11 1/4	5 9/16	2 9/16	14.00	15 1/2	7 3/4
1 3/32	4.15	11 7/16	5 23/32	2 5/8	14.60	16	8
1 1/8	4.30	11 5/8	5 1 3/16	2 1 1/16	15.40	16	8
1 5/32	4.45	11 1 3/16	5 29/32	2 3/4	16.20	16	8
1 3/16	4.60	12	6	2 1 3/16	17.00	16 1/2	8 1/4
1 7/32	4.75	12 1/8	6 1/16	2 7/8	17.80	16 1/2	8 1/4
1 1/4	4.90	12 1/4	6 1/8	2 1 5/16	18.60	16 1/2	8 1/4
1 9/32	5.05	12 1 1/32	6 1 1/64	3	19.40	16 1/2	8 1/4
1 5/16	5.20	12 7/16	6 7/32				

Reamers from 1/4 to 1 5/8 inch, and 1 1/16 to 2 inch. by 16ths, furnished in cases when desired.

ALWAYS GIVE LIST NUMBER WHEN ORDERING.

No. 155

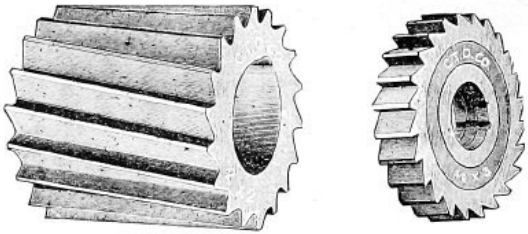
THREE-FLUTED CHUCKING REAMER.

Diam.	Price.	Length Over All.	Fitting Socket.	Diam.	Price.	Length Over All.	Fitting Socket.
3/8	$1.70	6 3/4 in.		1 7/16	$6.00	16 in.	
1 3/32	1.75	7 "		1 1/2	6.20	16 "	
7/16	1.80	7 1/4 "		1 1/2	6.40	16 "	
1 5/32	1.85			1 17/32	6.70	16 "	No. 4.
1/2	1.90	8 "		1 9/16	6.90	16 "	
1 7/32	1.95			1 19/32	7.25	16 "	
9/16	2.00	9 "		1 5/8	7.40	16 "	
1 9/32	2.30			1 21/32	7.65	16 "	
5/8	2.60	13 "	No. 2.	1 11/16	7.90	16 "	
1 21/32	2.70	13 "		1 23/32	8.15	16 "	
1 11/16	2.75	13 "		1 3/4	8.40	16 "	
1 23/32	2.85	13 "		1 25/32	8.60	16 "	
3/4	2.90	13 "		1 13/16	8.80	16 "	
1 25/32	3.00	13 "		1 27/32	9.00	16 "	
1 13/16	3.05	13 "		1 7/8	9.20	16 "	
1 27/32	3.15	13 "		1 29/32	9.40	16 "	
7/8	3.20	13 "		1 15/16	9.50	16 "	
1 29/32	3.30	13 "		1 31/32	9.70	16 "	
1 15/16	3.40	13 "		2	9.80	16 "	
1 31/32	3.50	13 "		2 1/16	10.60	18 "	No. 5.
1	3.60	13 "		2 1/8	11.20	18 "	
1 1/32	3.70	13 "	No. 3.	2 3/16	12.00	18 "	
1 1/16	3.80	13 "		2 1/4	12.80	18 "	
1 3/32	3.90	13 "		2 5/16	13.60	18 "	
1 1/8	4.00	13 "		2 3/8	14.40	18 "	
1 5/32	4.25	13 "		2 7/16	15.00	18 "	
1 3/16	4.50	16 "		2 1/2	15.60	20 "	
1 7/32	4.70	16 "		2 5/8	16.80	20 "	
1 1/4	4.80	16 "		2 3/4	19.00	20 "	
1 9/32	5.00	16 "	No. 4	2 7/8	21.00	20 "	
1 5/16	5.20	16 "		3	25.00	20 "	
1 11/32	5.40	16 "					
1 3/8	5.60	16 "					
1 13/32	5.80	16 "					

We make to order only Straight Shank Three-Fluted Chucking Reamers,

No. 132.

MILLING CUTTER.

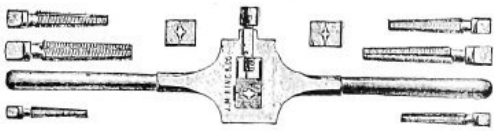


Width of Face.	Diameter	Price	Diameter	Price	Diameter	Price	Diameter	Price	Diameter	Price	Diameter	Price
$\frac{1}{4}$	$2\frac{1}{2}$	$1.40	$2\frac{3}{4}$	$1.50	3	$1.80	$3\frac{1}{2}$	$2.50	4	$3.20	5	$4.45
$\frac{5}{16}$	$2\frac{1}{2}$	1.50	$2\frac{3}{4}$	1.60	3	1.95	$3\frac{1}{2}$	2.70	4	3.40	5	4.70
$\frac{3}{8}$	$2\frac{1}{2}$	1.60	$2\frac{3}{4}$	1.70	3	2.10	$3\frac{1}{2}$	2.85	4	3.60	5	4.95
$\frac{7}{16}$	$2\frac{1}{2}$	1.70	$2\frac{3}{4}$	1.80	3	2.25	$3\frac{1}{2}$	3.00	4	3.80	5	5.20
$\frac{1}{2}$	$2\frac{1}{2}$	1.80	$2\frac{3}{4}$	1.90	3	2.40	$3\frac{1}{2}$	3 15	4	3.90	5	5.45
$\frac{9}{16}$	$2\frac{1}{2}$	2.00	$2\frac{3}{4}$	2.10	3	2.70	$3\frac{1}{2}$	3.45	4	4.30	5	5.95
$\frac{5}{8}$	$2\frac{1}{2}$	2.20	$2\frac{3}{4}$	2.30	3	3.00	$3\frac{1}{2}$	3.85	4	4.70	5	6.75
$\frac{3}{4}$	$2\frac{1}{2}$	2.40	$2\frac{3}{4}$	2.50	3	3.30	$3\frac{1}{2}$	4.35	4	5.15	5	7.35
1	$2\frac{1}{2}$	2.60	$2\frac{3}{4}$	3.05	3	3.60	$3\frac{1}{2}$	4.75	4	5.65	5	7.75
$1\frac{1}{4}$	$2\frac{1}{2}$	2.90	$2\frac{3}{4}$	3.60	3	4.00	$3\frac{1}{2}$	5.15	4	6.25	5	8.50
$1\frac{1}{2}$	$2\frac{1}{2}$	3.10	$2\frac{3}{4}$	3.90	3	4.30	$3\frac{1}{2}$	5.60	4	6.65	5	9.25
$1\frac{3}{4}$	$2\frac{1}{2}$	3.40	$2\frac{3}{4}$	4.00	3	4.50	$3\frac{1}{2}$	6.00	4	7.05	5	9.75
2	$2\frac{1}{2}$	3.70	$2\frac{3}{4}$	4.25	3	4.70	$3\frac{1}{2}$	6.40	4	7.45	5	11.00
$2\frac{1}{2}$	$2\frac{1}{2}$	4.10	$2\frac{3}{4}$	4.60	3	5.20	$3\frac{1}{2}$	6.90	4	8.40	5	12.35
3	$2\frac{1}{2}$	4.50	$2\frac{3}{4}$	5.00	3	5.40	$3\frac{1}{2}$	7.40	4	9.00	5	13.45
$3\frac{1}{2}$	$2\frac{1}{2}$	5.00	$2\frac{3}{4}$	5.50	3	5.90	$3\frac{1}{2}$	8.15	4	10.00	5	14.50
4	$2\frac{1}{2}$	5.50	$2\frac{3}{4}$	6.00	3	6.40	$3\frac{1}{2}$	9.15	4	11.00	5	15.55
5	$2\frac{1}{2}$	6.90	$2\frac{3}{4}$	7.40	3	7.80	$3\frac{1}{2}$	10 40	4	13.50	5	17.00
6	$2\frac{1}{2}$	8.50	$2\frac{3}{4}$	10.00	3	10.80	$3\frac{1}{2}$	11.90	4	15.50	5	20.00

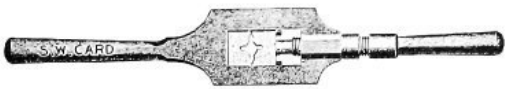
Cutters of $2\frac{1}{2}$ inches diameter have holes 1 inch diameter.

Cutters over $2\frac{1}{2}$ inches diameter kept in stock with holes 1, $1\frac{1}{4}$, $1\frac{1}{2}$ and 2 inches diameter.

BLACKSMITHS' STOCKS AND DIES.



No. 1.	Cuts 2 inches to 1 inch, R. H., 4½ and 7 threads to inch, 8 taps, 4 pair dies												$60 00
	" 2 "	1 "	L. H., 4½ and 7	"	"	"	8	"	4	"	"		60 00
No. 2.	" 2 "	½ "	R. H., 4½, 6, 7, 8	"	"	"	8	"	4	"	"		60 00
No. 3.	" 1⅞ "	½ "	R. H., 6 and 8	"	"	"	8	"	4	"	"		45 00
	" 1⅞ "	½ "	L. H., 6 and 8	"	"	"	8	"	4	"	"		45 00
No. 4.	" 1⅞ "	¾ "	R. H., 6, 7, 8, 9	"	"	"	8	"	4	"	"		45 00
No. 5.	" 1½ "	¾ "	R. H., 8 and 9	"	"	"	8	"	4	"	"		35 00
	" 1½ "	¾ "	L. H., 8 and 9	"	"	"	8	"	4	"	"		35 00
No. 5½.	" 1½ "	¾ "	R. H., 6, 7, 8, 9	"	"	"	8	"	4	"	"		35 00
No. 7.	" 1¼ "	⅝ "	R. H., 8 and 10	"	"	"	6	"	3	"	"		12 00
	" 1¼ "	⅝ "	L. H., 8	"	"	"	6	"	3	"	"		12 00
No. 9.	" 1¼ "	½ "	R. H., 8, 10, 12	"	"	"	6	"	3	"	"		12 00
No. 17.	" 1 "	½ "	R. H., 9 and 12	"	"	"	6	"	3	"	"		9 00
	" 1 "	½ "	L. H., 9	"	"	"	6	"	3	"	"		9 00
No. 19.	" 1 "	⅜ "	R. H., 9, 12, 14	"	"	"	6	"	3	"	"		9 00
No. 25.	" ¾ "	⅜ "	R. H., 10 and 12	"	"	"	6	"	6	"	"		6 50
	" ¾ "	½ "	L. H., 10	"	"	"	6	"	6	"	"		6 50
No. 27.	" ¾ "	¾ "	R. H., 10, 12, 16	"	"	"	6	"	3	"	"		6 50
No. 45.	" ⅝ "	5-16 "	R. H., 12 and 16	"	"	"	6	"	3	"	"		5 50
	" ⅝ "	7-16 "	L. H., 12	"	"	"	6	"	3	"	"		5 50
No. 47.	" ⅝ "	¼ "	R. H., 12, 14, 18	"	"	"	6	"	3	"	"		5 50
No. 49.	" ½ "	¼ "	R. H., 14 and 18	"	"	"	6	"	3	"	"		4 50
	" ½ "	5-16 "	L. H., 14	"	"	"	6	"	3	"	"		4 50
No. 51.	" ½ "	3-16 "	R. H., 14, 18, 22	"	"	"	6	"	3	"	"		4 50
No. 60.	" ¼ "	⅛ "	R. H., 10, 12, 14, 18	"	"	"	6	"	4	"	"		6 50

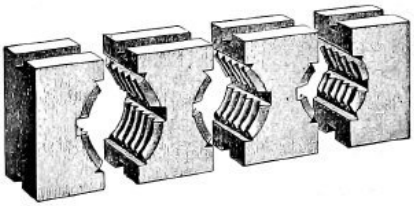


No. 2½.	11½ inches long, 3 pairs dies and 3 taps, cutting ¼, 20; ⅜, 16; ½, 13											Each	$5 00
" 2½ A.	11½	"	"	3	"	"	"	3	"	"	¼, 20; 5-16, 18; ⅜, 16; 7-16, 14	"	4 80
" 2½ B.	11½	"	"	3	"	"	"	3	"	"	5-16, 18; ⅜, 16; 7-16, 14	"	5 00
" 3 C.	14	"	"	3	"	"	"	3	"	"	⅜, 16; 7-16, 14; ½, 12	"	7 50
" 3	14	"	"	4	"	"	"	4	"	"	⅜, 16; 7-16, 14; ½, 12; ⅝, 11	"	7 15
" 4	19	"	"	3	"	"	"	3	"	"	½, 12; ⅝, 11; ¾, 10	"	6 90
" 4 A.	19	"	"	3	"	"	"	3	"	"	½, 10; ⅝, 9; 1, 8	"	10 00
" 7 A.	27	"	"	3	"	"	"	3	"	"	¾, 10; ⅞, 9; 1, 8	"	10 00
" 8.	30	"	"	4	"	"	"	4	"	"	¾, 10; ⅞, 9; 1, 8; 1¼	"	16 50

BLACKSMITHS' STOCKS AND DIES.—Continued.

No. 6.	Cuts 1½	inch to	1	inch,	R. H., 8	threads to inch,	4	taps,	2	sets of dies		$20 00
	" 1½	"	1	"	L. H., 8	" " "	4	"	2	" "		20 00
No. 11.	" 1¼	"	⅞	"	R. H., 8 and 10	" " "	4	"	3	" "		10 00
	" 1¼	"	⅞	"	L. H., 8	" " "	4	"	3	" "		10 00
No. 15.	" 1¼	"	⅞	"	R. H., 8, 10, 12	" " "	5	"	3	" "		10 00
No. 21.	" 1	"	¾	"	R. H., 9 and 12	" " "	4	"	3	" "		6 00
	" 1	"	¾	"	L. H., 9	" " "	4	"	3	" "		6 00
No. 23.	" 1	"	⅝	"	R. H., 9, 10, 14	" " "	3	"	3	" "		5 00
No. 32.	" ⅞	"	⅝	"	R. H., 10 and 14	" " "	4	"	4	" "		5 00
	" ⅞	"	⅝	"	L. H., 10 and 14	" " "	4	"	4	" "		5 00
No. 33.	" ¾	"	½	"	R. H., 10	" " "	2	"	2	" "		4 00
	" ¾	"	½	"	L. H., 10	" " "	2	"	2	" "		4 00
No. 34.	" ¾	"	5-16	"	R. H., 10, 12, 16	" " "	3	"	3	" "		4 50
No. 34A.	" ¾	"	5-16	"	R. H., 10, 12, 14	" " "	3	"	3	" "		4 50
No. 34B.	" ¾	"	5-16	"	R. H., 12, 14, 16	" " "	3	"	3	" "		4 50
No. 35.	" ¾	"	⅜	"	R. H., 10 and 14	" " "	2	"	2	" "		4 00
No. 37.	" ⅝	"	3-16	"	R. H., 14, 18, 22	" " "	6	"	3	" "		4 25
No. 37A.	" ⅝	"	3-16	"	R. H., 12, 14, 16	" " "	6	"	3	" "		4 25
No. 37B.	" ⅝	"	3-16	"	R. H., 14, 16, 18	" " "	6	"	3	" "		4 25
No. 38.	" ⅝	"	5-16	"	R. H., 12 and 18	" " "	6	"	3	" "		4 50
	" ⅝	"	7-16	"	L. H., 12	" " "	6	"	3	" "		4 50
No. 41.	" ½	"	½	"	R. H., 16, 20, 26	" " "	6	"	3	" "		3 25
No. 41A.	" ½	"	½	"	R. H., 14, 16, 18	" " "	6	"	3	" "		3 25
No. 41B.	" ½	"	½	"	R. H., 16, 18, 20	" " "	6	"	3	" "		3 25
No. 42.	" ½	"	3-16	"	R. H., 14 and 20	" " "	6	"	3	" "		3 50
	" ½	"	5-16	"	L. H., 14	" " "	6	"	3	" "		3 50
No. 53.	" 5-16	"	1-16	"	R. H., 16, 20, 24, 30	" " "	4	"	4	" "		2 75
No. 55.	" 5-16	"	1-16	"	R. H., 18, 24, 32	" " "	4	"	3	" "		2 50

BLACKSMITHS' DIES.
FURNISHED EXTRA.



COMPLETE SET OF DIES.

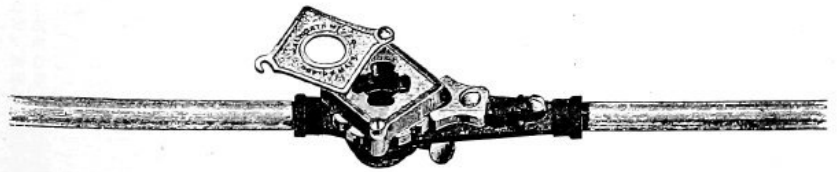
or No. 1 or 2	Stock	$12 00
" 3 or 4	"	10 00
" 5 or 5½	"	8 00
" 6	"	6 00
" 7 or 9	"	3 50
" 11 or 15	"	3 00
" 17 or 19	"	2 50
" 21 or 23	"	2 00
" 25, 27 or 32	Stock	2 25
" 33	"	1 50
" 34	"	2 00
" 35, 37, 38, 41 or 42	Stock	1 50
" 45 or 47	Stock	2 25
" 49 or 51	"	2.00
" 53 or 55	"	1 50

SCREW PLATES.

MALLEABLE IRON. WITH SOLID DIES.

No.	Threads.	Dimensions of Dies.	Die Plates Complete.	Without Dies.	Extra Dies.	Extra Bushings.	Extra Die Frames.
0	$\frac{1}{8}$ to $\frac{1}{2}$	2 x 2 x $\frac{1}{4}$	9.50	3.50	1.50	.25	...
1	$\frac{1}{4}$ to 1	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{4}$	15.00	5.00	2.00	.35	.30
$1\frac{1}{4}$	$\frac{3}{4}$ to $1\frac{1}{4}$	3 x 3 x $\frac{3}{4}$	13.50	6.00	2.50	.45	.40
$1\frac{3}{4}$	1 to $1\frac{1}{2}$	3 x 3 x $\frac{3}{4}$	13.50	6.00	2.50	.45	.40
2	$1\frac{1}{4}$, $1\frac{1}{2}$ & 2	4 x 4 x $\frac{3}{4}$	20.00	9.50	3.50	.60	.50
3	$2\frac{1}{2}$ & 3	5 x 5 x $1\frac{1}{4}$	43.00	25.00	9.00	1.00	.60
4	$2\frac{1}{2}$ & 3	5 x 5 x $1\frac{1}{4}$	51.00	33.00	9.00	1.00	.60

MILLER'S REVERSIBLE RATCHET STOCK.



No.	Threads.	Dimensions of Dies.	Die Plates Complete.	Without Dies.	Extra Dies.	Extra Bushings.	Extra Die Frames.
A	$\frac{1}{8}$ to $\frac{3}{4}$	2 x 2 x $\frac{1}{2}$	13.00	7.50	1.10	.20	...
B	$\frac{1}{4}$ to 1	$2\frac{1}{2}$ x $2\frac{1}{2}$ x $\frac{3}{4}$	15.00	8.50	1.50	.25	.22
C	1 to $1\frac{1}{2}$	3 x 3 x $\frac{3}{4}$	18.50	13.00	1.80	.35	.30
D	$1\frac{1}{4}$ to 2	4 x 4 x $\frac{1}{8}$	20.00	13.50	2.50	.45	.38
E	$2\frac{1}{2}$ & 3	5 x 5 x $1\frac{1}{4}$	43.00	29.00	7.00	.75	.45

THE GREEN RIVER SCREW PLATE.

FIG. 1341.

FIG. 1342.

FIG. 1343.

This cut (Fig. 1341) shows the Die ready for clamping in the elastic stock.

The cuts (Figs. 1342 and 1343) show a Die and Guide taken apart to show the mechanism. The cup-headed screw on the right holds the halves firmly together, acting as a hinge, while the size is regulated by the wedge-shaped (taper head) screw on the left, the whole being clamped in the elastic stock.

MACHINE HOLDERS.

BRACE HOLDERS.

COMPLETE IN CASE WITH TAPS, DIES AND GUIDES.

		Prices.
Set No. 1.	3-16 to 7-16 inch, Stock 10 inches, sizes 3-16, ¼, 5-16, ⅜, 7-16 inch	$ 8 75
Set No. 1.	3-16 to 7-16 as above, with adjustable tap wrench No. 2	11 10
Brace Holders for No. 1 Set		Each, 75
Set No. 1¼.	3-16 to ½ inch, Stock 18 inches, sizes 3-16, ¼, 5-16, ⅜, 7-16, ½ inch	11 00
Set No. 1¼.	3-16 to ½ inch as above, with adjustable tap wrench No. 2	13 35
Brace Holders for No. 1¼ Set		Each, 1 50
Set No. 1½.	¼ to ½ inch, Stock 22 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾ inch	13 10
Set No. 1½.	¼ to ¾ inch as above, with adjustable tap wrench No. 3	16 00
Brace Holders for No. 1½ Set		Each, 1 50
Set No. 2.	¼ to ¾ inch, Stock 23 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾ inch	15 25
Set No. 2.	¼ to ¾ inch as above, with adjustable tap wrench No. 3	18 [illegible]
Set No. 3.	½ to 1 inch, Stock 29 inches, sizes ½, ⅝, ¾, ⅞, 1 inch	17 00
Set No. 3.	½ to 1 inch as above, with adjustable tap wrench No. 4	21 00
Set No. 4.	⅜ to 1 inch, Stock 29 inches, sizes ⅜, 7-16, ½, ⅝, ¾, ⅞, 1 inch	20 00
Set No. 4.	⅜ to 1 inch as above, with adjustable tap wrench No. 4	24 00
Set No. 5.	¼ to 1 inch, Stock 29 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1 inch	23 00
Set No. 5.	¼ to 1 inch as above, with adjustable tap wrenches Nos. 2 and 4	29 35
Set No. 6.	½ to 1½ inch, Stock 35 inches, sizes ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼ inch	26 00
Set No. 7.	⅜ to 1½ inch, Stock 35 inches, sizes ⅜, 7-16, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼ inch	30 00
Set No. 8.	¼ to 1½ inch, Stock 35 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼ inch	34 00
Set No. 9.	¼ to 1½ inch, Stock 53 inches, sizes ¼, 7, 1⅛, 1¼, 1⅜, 1½ inch	40 00
Set No. 13.	¼ to 1 inch, 2 Stocks 22 and 29 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1 inch	25 00
Set No. 13.	¼ to 1 inch as above, with adjustable tap wrenches, Nos. 2 and 4	31 35
Set No. 16.	¼ to 1¼ inch, 2 Stocks 22 and 35 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼ inch	36 00
Set No. 25.	¼ to 1½ inch, 2 Stocks 22 and 53 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½ inch	53 00

STOCKS FOR GREEN RIVER SCREW PLATES.

Length Stock.	Diam. Socket.	Price Each.	Length Stock.	Diam. Socket.	Price Each.	Length Stock.	Diam. Socket.	Price Each.	Length Stock.	Diam. Socket.	Price Each.
10 in.	1 3/8	$1.50	22 in.	2 3/16	$2.00	29 in.	2 1/4	$2.00	53 in.	3 1/16	$6.00
18 "	2 1/16	2.00	23 "	2 1/4	2.00	35 "	2 3/4	4.00			

DIES, TAPS AND GUIDES.

FOR SET No. 1.

Dies, all regular sizes ..... Each, $1 00
Guides ..... " 20
Stock ..... " 1 50

PRICES, DIES, TAPS AND GUIDES FOR ALL GREEN RIVER SCREW PLATES, (EXCEPT SET No. 1.)

Sizes.	Taps, Dies and Guides.	Dies.	Taps.	Guides.	No. of Threads.	Sizes.	Taps, Dies and Guides.	Dies.	Taps.	Guides.	No. of Threads.
3/16	$1.77	$1.25	$0.45	$0.25	24	3/4	$2.97	$2.00	$1.20	$0.25	10, 12
1/4	1.77	1.25	.45	.25	16, 18, 20	13/16	3.34	2.25	1.40	.25	10
5/16	1.80	1.25	.50	.25	16, 18	7/8	3.71	2.50	1.60	.25	9, 10
11/32	2.08	1.50	.55	.25	14, 16, 18	15/16	4.08	2.75	1.80	.25	9
7/16	2.11	1.50	.60	.25	12, 14, 16	1	4.45	3.00	2.00	.25	8
1/2	2.17	1.50	.70	.25	12, 13, 14	1 1/16	5.10	3.50	2.25	.25	7, 8
9/16	2.33	1.60	.80	.25	12, 14	1 1/8	5.81	4.00	2.60	.25	7
5/8	2.54	1.75	.90	.25	10, 11, 12	1 3/16	6.55	4.50	3.00	.25	6
11/16	2.78	1.90	1.05	.25	11, 12	1 1/4	7.35	5.00	3.50	.25	6

GREEN RIVER ADJUSTABLE TAP AND REAMER WRENCHES.

Size No. 1, Length 7 inches, for taps 1/4 inch and smaller ..... Price, $1 75
" " 2, " 11 " " " 3-16 to 1/2 inch, inclusive ..... " 2 35
" " 3, " 16 " " " 1/4 to 3/4 inch, inclusive ..... " 3 00
" " 4, " 19 " " " 3/4 to 1 inch, inclusive ..... " 4 00
" " 5 " 34 " " " 7/8 to 1 1/2 inch, inclusive ..... " 8 00

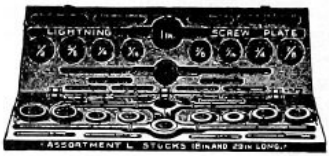
LIGHTNING ADJUSTABLE TAP AND REAMER WRENCHES.

Size A, Length 10 1/2 inches, for taps 3-16 to 1/2 inch ..... Price, $3 00
B, " 15 " " " " 1/4 to 3/4 inch ..... " 3 50
C, " 20 " " " " 3/4 to 1 inch ..... " 5 00

THE LIGHTNING SCREW PLATE.

BIT BRACE HOLDER.

For Sets A and A1, 75 cts. each
" " AA.....$1.50 "



MACHINE HOLDER.

For Sets A and A1 Each, $0.75
" " AA..... " 1.50

COMPLETE IN CASE WITH CAPS, DIES AND COLLETS.

Set A.	3-16 to 7-16 inch, stock 10 inches, sizes 3-16, ¼, 5-16, ⅜, 7-16 inch	$ 8 00
Set A.	3-16 to 7-16 inch as above, with adjustable tap wrench No. 2	10 35
Set A.	Nos. 14 to 24, screw gages sizes, stock 10 inches, sizes Nos. 14, 16, 18, 20, 24	8 00
Set A.	Nos. 14 to 24, screw gages sizes as above, with adjustable tap wrench No. 2	10 35
Set A.	Nos. 10 to 24, screw gages sizes, stock 10 inches, sizes Nos. 10, 12, 14, 16, 18, 20, 24	10 00
Set A.	Nos. 10 to 24, screw gages sizes as above, with adjustable tap wrench No. 2	12 35
Set A1.	3-16 to 7-16 inch, stock 10 inches, sizes 3-16, ¼, 5-16, ⅜, 7-16 inch	10 00
Set AA.	3-16 to ½ inch, stock 18 inches, sizes 3-16, ¼, 5-16, ⅜, 7-16, ½ inch	13 50
Set AA.	3-16 to ½ inch, stock 18 inches, as above, with adjustable tap wrench No. 2	15 85
Set B.	¼ to ¾ inch, stock 23 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾ inch	16 00
Set B.	¼ to ¾ inch, stock 23 inches, as above, with adjustable tap wrench No. 3	19 00
Set C.	¼ to 1 inch, stock 29 inches, sizes ¼, ⅜, ½, ⅝, 1 inch	18 50
Set C.	¼ to 1 inch, stock 29 inches, as above, with adjustable tap wrench No. 4	22 50
Set C.	⅜ to 1 inch, stock 29 inches, sizes ⅜, 7-16, ½, ⅝, ¾, 1 inch	22 00
Set C.	⅜ to 1 inch, stock 29 inches, as above, with adjustable tap wrench No. 4	26 00
Set C.	¼ to 1 inch, stock 29 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1 inch	25 50
Set C.	¼ to 1 inch, stock 29 inches, as above, with adjustable tap wrenches, Nos. 2 and 4	31 85
Set D.	⅜ to 1½ inch, stock 53 inches, sizes ⅜, 1, 1⅛, 1¼, 1⅜, 1½ inch	45 00
Set K.	¼ to ¾ inch, 2 stocks 18 and 23 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾ inch	18 00
Set K.	¼ to ¾ inch, 2 stocks 18 and 23 inches, as above, with adjustable tap wrench No.3	21 00
Set L.	¼ to 1 inch, 2 stocks 18 and 29 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, 1 inch	27 50
Set L.	¼ to 1 inch, 2 stocks 18 and 29 inches, as above, with adjustable tap wrenches Nos. 2 and 4	33 85
Sets D and B.	¼ to 1½ inch, 2 stocks 23 and 53 inches, sizes ¼, 5-16, ⅜, 7-16, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1⅜, 1½	61 00

Note.—Sets A include taps, dies and guides.
Sets A1 include taps, dies, brace holder and nut wrenches.

PUMP MAKERS' LIGHTNING TAPS, DIES AND HOLDERS.

FOR BIT BRACE.

PRICES

Dies and Guides 3-16 to 7-16 inch (outside diameter 1 5-16 inch)	$1 20
Die and Guide ¼ inch (outside diameter 2 3-16 inch)	2 00
Holders for Dies, sizes 3-16 to 7-16 inch	75
Holders for Dies, size ¼ inch	1 50
Guides alone, for Dies 3-16 to 7-16 inch, each	20
Guides alone, for Die ¼ inch, each	25
Stocks (10 inches long. .....for Dies 3-16 to 7-16 inch	1 50
Stocks (18 inches long. .....for Die ¼ inch	2 00

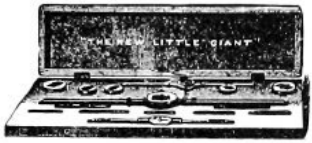
Taps	⅛ in.	¼ in.	⅜ in.	⅜ in.	½ in.	⅝ in.
Prices	$0.50	$0.50	$0.55	$0.60	$0.70	$0.80

Unless otherwise ordered, we supply these Taps and Dies 1-32 inch over exact size, for rough iron, V thread.

NEW LITTLE GIANT SCREW PLATE.

SECTIONAL VIEW O DIE AND COLLET.

TAP



These plates are sold complete; if other sizes are desired add prices as below.

LIST OF ASSORTMENTS.

Each Assortment is put up in a neat Wood Case, as shown in Cuts.

No. A1	has	Stock	and	Tap	Wrench.	Cuts	1/4, 5-32, 3-16, 7-32, 1/4	$ 6 50
No. A2	"	"	"	"	"	"	7-64, 1/8, 9-64, 5-32, 3-16, 7-32, 1/4	8 00
No. A3	"	"	"	"	"	"	7-64, 1/8, 9-64, 5-32, 11-64, 3-16, 13-64, 7-32, 15-64, 1/4	10 50
No. 1	"	"	14½	inches	long	"	1/4, 5-16, 3/8, 7-16, 1/2	12 00
No. 2	"	"	23	"	"	"	1/4, 3/8, 1/2, 5/8, 3/4	13 50
No. 3	"	"	26	"	"	"	1/4, 3/8, 1/2, 5/8, 1 inch	15 00
No. 4	"	"	26	"	"	"	1/4, 3/8, 1/2, 5/8, 1 inch	17 50
No. 5	"	"	23	"	"	"	1/4, 5-16, 3/8, 7-16, 1/2, 5/8, 3/4	16 00
No. 5½	"	"	23	"	"	"	1/4, 5-16, 3/8, 7-16, 1/2, 9-16, 5/8, 3/4	18 50
No. 6	"	"	26	"	"	"	1/4, 7-16, 1/2, 5/8, 3/4, 7/8, 1 inch	22 00
No. 7	"	"	26	"	"	"	1/4, 5-16, 3/8, 7-16, 1/2, 5/8, 3/4, 7/8, 1 inch	25 50
No. 8	"	"	14½	"	"	for first four sizes, and 26- inch Stock for the larger sizes. Cuts 1/4, 5-16, 3/8, 7-16, 1/2, 5/8, 3/4		18 00
No. 9	"	"	14½	"	"	for first four sizes, and 29-inch Stock for the larger sizes. Cuts 1/4, 5-16, 3/8, 7-16, 1/2, 5/8, 3/4, 7/8, 1 inch		27 50
No. 20	"	"	40	"	"	Cuts 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4 inch		35 00
No. 25	"	"	52	"	"	" 5/8, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2 inch		45 00
No. 30	"	"	52	"	"	" 1 1/8, 1 1/4, 1 3/8, 1 1/2 inch		37 50
No. 40	"	"	23	"	"	for first seven sizes, 40-inch Stock for the larger sizes. Cuts 1/4, 5-16, 3/8, 7-16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4 inch		40 00
No. 50.	"	"	26	"	"	for first nine sizes, 52-inch Stock for the larger sizes. Cuts 1/4, 5-16, 3/8, 7-16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2 inches		60 00

PRICES OF STOCKS FOR NEW LITTLE GIANT SCREW PLATES.

Stock	7½	inches	long,	for	collets,	1¼	diameter	$0 70	Stock	29	inches	long,	for collets	2½ diameter	$2 00
"	14½	"	"	"	"	2	"	1 50	"	40	"	"	"	4 "	6 00
"	23	"	"	"	"	2½	"	2 00	"	52	"	"	"	4½ "	8 00
"	26	"	"	"	"	2¾	"	2 00							

PRICES OF TAPS, DIES, ETC., FOR NEW LITTLE GIANT SCREW PLATE.

Diam. Inches.	No. of Threads to Inch.	Price of Tap.	Price of Die.	Price of Tap, Die and Collet for Plates Nos. 1 to 9.	Price of Tap, Die and Collet for Plates Nos. 20, 25, 30, 40, 50.	Diam. Inches.	No. of Threads to Inch.	Price of Tap.	Price of Die.	Price of Tap, Die and Collet for Plates Nos. 1 to 9.	Price of Tap, Die and Collet for Plates Nos. 29, 25, 30, 40 50.
1/4	24	$0.35	$1.00	$1.85	.....	3/4	10	$1.20	$2.00	$3.70	$4.70
1/4	20	.45	1.00	1.95	.....	1 1/8	10	1.40	2.00	3.90	.....
5/16	18	.50	1.00	2.00	.....	1 1/4	9	1.60	2.75	4 85	5.85
3/8	16	.55	1.25	2.30	.....	1 3/8	9	1.80	2.75	5.05	.....
7/16	14	.60	1.25	2.35	.....	1	8	2.00	2.75	5.25	6.25
1/2	12	.70	1.50	2.70	.....	1 1/8	7	2.25	4.00	.....	7.75
9/16	12	.80	1.50	2.80	.....	1 1/4	7	2.60	4.00	.....	8.10
5/8	11	.90	1.75	3.15	$4.15	1 3/8	6	3.00	5.00	.....	9.50
11/16	11	1.05	1.75	3.30	.....	1 1/2	6	3.50	5.00	.....	10.00

PRICE OF COLLETS FOR NEW LITTLE GIANT SCREW PLATE.

No. A1.	7-64 to 1/4 inch, 1 1/4 inch diameter	$0 40	No. 20. 5/8 to 1 1/4 inch, 4 inch diameter	$1 50
No. 1.	1/4 to 1/2 inch, 2 inch diameter	50	No. 30. 1 1/8 to 1 1/2 inch, 4 1/2 inch diameter	1 50
No. 6.	1/4 to 1 inch, 2 3/4 inch diameter	50		

Left hand taps and dies furnished at same price as right hand.
Prices for special taps and dies furnished on application.

THE CHAMPION

ELECTRIC FULL-MOUNTED SCREW PLATES.

No. 101, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}''$, ... $12.00

No. 102, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{3}{8}^{16}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, ... 15.50

No. 103, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{5}{16}^{24}$, $\frac{3}{8}^{20}$, $\frac{7}{16}^{18}$, ... 17.00

No. 104, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{2}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, ... 19.50

No. 105, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, ... 18.00

No. 105½, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, ... 26.50

No. 106, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{5}{16}^{24}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, ... 24.00

No. 107, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, ... 29.50

No. 107½, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{12}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, ... 32.00

Unless otherwise ordered, we will send all Screw Plates $\frac{1}{32}$ oversize V thread. Can supply Screw Plates with exact sizes, V, U. S. Standard, or Franklin Institute and Whitworth form of thread at regular prices when ordered.

P. S. $\frac{3}{8}''$ Die, Stock Guide and Tap furnished with any of the above sets, $2.10.

THE CHAMPION

"EASY" FULL-MOUNTED SCREW PLATE.

PRICES AND DIMENSIONS.

No. 51, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{12}$, ... $10.50

No. 52, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, . . . 12.80

No. 53, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{5}{16}^{24}$, $\frac{3}{8}^{20}$, $\frac{7}{16}^{18}$, $\frac{1}{2}^{16}$, $\frac{9}{16}^{14}$, $\frac{5}{8}^{13}$, $\frac{3}{4}^{12}$, $\frac{7}{8}^{11}$, $1''$, ... 14.40

No. 54, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{1}{2}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, ... 16.60

No. 55, Plate Complete in Box. With adjustable Tap Wrench. Cutting $1\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, ... 15.00

No. 55½, Plate Complete in Box. With adjustable Tap Wrench. Cutting $1\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, ... 18.20

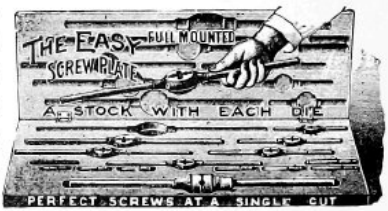
No. 56, Plate Complete in Box. With adjustable Tap Wrench. Cutting $\frac{5}{16}^{24}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{12}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, . . . 21.35

No. 57, Plate Complete in Box. With adjustable Tap Wrench. Cutting $1\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, . . . 24.40

No. 57½, Plate Complete in Box. With adjustable Tap Wrench. Cutting $1\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{9}{16}^{12}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, $1''$, . . . 27.00

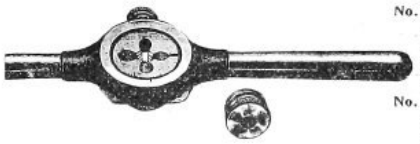
Unless otherwise ordered, we will send all Screw Plates $\frac{1}{32}$ oversize V thread. Can supply Screw Plates with exact sizes V, U. S. Standard or Franklin Institute and Whitworth form of thread, at regular price, when ordered.

P. S. $\frac{3}{8}''$ Die, Stock and Tap furnished with any of the above sets, $1.95.



THE CHAMPION SCREW PLATES.

Small Sizes in Sets.



No. 70, Plate with Tap Wrench. Stock 7 inches long, Tap Wrench 7½ inches long, 5 Dies thirteen-sixteenths of an inch in Diameter, 5 Guides and 5 Taps. Cutting $\frac{1}{4}^{20}$, $\frac{5}{32}^{32}$, $\frac{7}{64}^{24}$, $\frac{5}{32}^{24}$ $\frac{1}{4}^{20}$. Price, ... $5.75

No. 71, Plate with Tap Wrench. Stock 7 inches long, Tap Wrench 7½ inches long, 7 Dies thirteen-sixteenths of an inch in diameter, 7 Guides and 7 Taps. Cutting $\frac{7}{64}^{56}$, $\frac{1}{4}^{20}$, $\frac{5}{64}^{40}$, $\frac{5}{32}^{32}$, $\frac{3}{16}^{24}$, $\frac{5}{32}^{24}$, $\frac{1}{4}^{20}$ Price, ... $7.00

ARMSTRONG'S ADJUSTABLE STOCK,

AND DIES FOR THREADING PIPE.

No. 1.	Stock, 4 R. H. Pipe, Dies, ⅛ to ½ inch,	$ 9.00
1.	" 4 each R. H. and L. H. Pipe, Dies. ⅛ to ½ in.	14.00
2.	" 5 R. H. Pipe Dies, ¼ to 1 inch,	12.00
2.	" 6 " " " ⅛ to 1 "	14.00
2.	" 5 each R. H. and L. H. Pipe, Dies, ¼ to 1 inch,	20.00
2.	" 6 " " " " " ⅛ to 1 "	23.00
2½.	" 4 R. H. Pipe Dies, ½ to 1¼ inch,	12.00
2½.	" 4 each R. H. and L. H. Pipe Dies, ½ to 1¼ in.	18.00
3.	" 3 R. H. Pipe Dies, 1¼ to 2 inch,	20.00
3.	" 4 " " " 1 to 2 inch	24.00
3.	" 5 " " " ¾ to 2 inch,	28.50
3.	" 3 each R. H. and L. H. Pipe Dies, 1¼ to 2 inch,	32.00
3.	" 4 " " " " " " 1 to 2 inch,	40.00
3.	" 5 " " " " " " ¾ to 2 inch,	48.50

PRICE LIST OF PARTS.

Nos.	1	2	2½	3
Stocks	$3 25	$4 00	$4 50	$7 00
Dies	1 25	1 50	3 25	4 00
Bushings	20	25	40	50

Nos.	1	2	2½	3
Wrenches	$0 25	$0 25	$0 25	$0 50
Collar Screws	12	12	15	15
Adjusting Screws	10	10	15	15
Thumb Screws	10	10	10	15

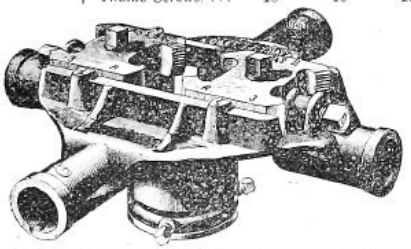
ARMSTRONG'S ADJUSTABLE STOCK AND DIES,

FOR THREADING PIPE 2½ AND 3 INCH.

PRICES.

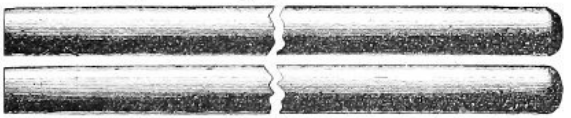
No. 6. Stock, R. H., cutting 2½ and 3 inch pipe, ... $40.00

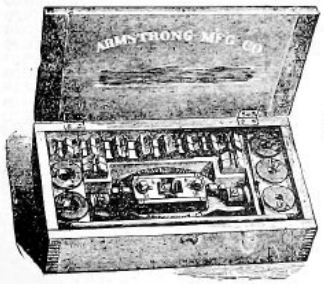
No. 6. Stock, R. H. and L. H., cutting 2½ and 3 inch pipe, ... 55.00



PRICE LIST OF PARTS.

Stock	$25 00
Dies	15 00
Bushings	1 00
Wrenches	50
Collar Screws	25
Adjusting Screws	20





No.	Sizes.	Price Each.
7	Stock, cutting 2½, 3, 3½ 4 right	260.00
7	" " 2½ and 3, right	45.00
7	" " 3½ and 4, right	45.00
7	" " 2½ and 4, right and left	92.00
7	" " 2½ and 3 or 3½ and 4, right and left	60.00

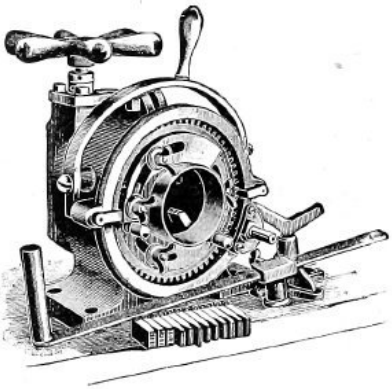
These dies come in sets of four pieces, each piece being double ended. Can furnish them threaded 2½ and 3 or 3½ and 4 inch. Have same adjustable features and double taper as our other dies.

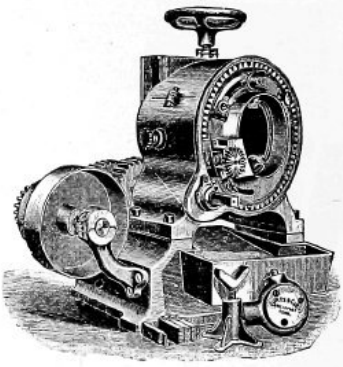
ARMSTRONG'S ADJUSTABLE STOCK AND DIES

FOR THREADING BOLTS AND PIPE.

No. 0.	Stock, 7 bolt dies and 7 taps, ¾ to ¼ inch,	$20.00
1.	Stock, 7 bolt dies and 7 taps, ½ to ¼ "	20.00
1.	Stock, 4 pipe dies, 7 bolt dies, 7 taps, ¼ to ⅜ inch,	24.80
2.	Stock, 7 bolt dies and 7 taps, ⅜ to 1¼ inch,	30.00
2.	Stock, 7 bolt dies and 7 taps, ½ to 1¼ in. and 5 pipe dies, ¼ to 1 in.	38.75

FORBES' PATENT DIE STOCK.





PRICE LIST FOR HAND MACHINES.

Number.	RANGE.	Weight, Net, Lbs.	Weight, Gross.	Price.
*30	¼ to 2 in., both Right and Left	138	178	$50.00
*32	¼ to 2 in., for Solid Dies (without dies)	130	170	45.00
*34	1 to 3 in. R. H., 1 to 2 in., L. H	155	195	75.00
*36	¾ to 3 in., R. H., ¾ to 2 in., L. H	160	200	85.00
*37	¼ to 3 in., R. and L	160	200	105.00
†46	2½ to 4 in., R. H	220	270	85.00
*38	1½ to 4 in., R. H	222	272	100.00
*40	1½ to 4 in., R. and L	225	275	115.00
*42	1 to 4 in., R. H	223	273	110.00
*44	1 to 4 in., R. and L	235	285	130.00
†50	4 to 6 in., R. H	298	376	115.00
†52	3½ to 6 in., R. H	298	376	130.00
†54	2½ to 5 in., R. H	300	378	150.00
†56	2½ to 6 in., R. H	303	381	175.00
†62	2½ to 6 in., R. H. (extra heavy)	750	885	300.00
*58	1 to 6 in., R. H	330	408	190.00
*60	1 to 6 in., R. and L	348	426	235.00
*63	2½ to 8 in., R. and L	625	750	360.00
†64	2½ to 8 in., R. H	600	725	325.00
†66	2½ to 10 in., R. H	750	880	500.00
*67	2½ to 10 in., R. H	760	890	500.00
*68	2½ to 10 in., R. and L	800	950	550.00
†69	2½ to 12 in., R. H	1000	1200	650.00
*(9)½	2½ to 12 in., R. and L	1050	1250	750.00

PRICE LIST FOR HAND OR POWER MACHINES.

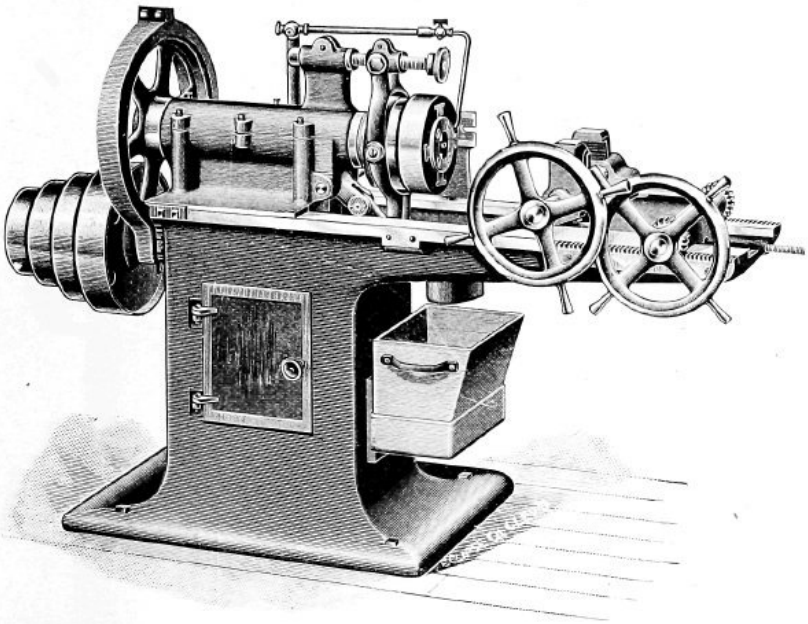
Number.	RANGE.	Weight, Net, Lbs.	Weight, Gross.	Price.
*70	¼ to 2 in., R. and L	320	430	$100 00
*72	¼ to 2 in., for Solid Dies (without dies)	315	425	95.00
*74	1 to 3 in., R. H., 1 to 2 in. L. H	340	459	125.00
*76	¾ to 3 in., R. H, ¾ to 2 in. L. H	343	462	135.00
*77	¼ to 3 in., R. and L	348	467	155.00
†78	2½ to 4 in., R. H	515	652	140.00
*80	1½ to 4 in., R. H	516	653	150.00
*82	1½ to 4 in., R. and L	517	654	165.00
*84	1 to 4 in., R. H	516	653	160.00
*86	1 to 4 in., R. and L	527	664	180.00
†88	4 to 6 in., R. H	635	813	170.00
†90	3½ to 6 in., R. H	640	818	180.00
†92	2½ to 5 in., R. H	640	818	200.00
†94	2½ to 6 in., R. H	645	823	225.00
*96	1 to 6 in., R. H	665	843	250.00
*98	1 to 6 in., R. and L	675	853	285.00
*99	2½ to 8 in., R. and L	1130	1215	535.00
†100	2½ to 8 in., R. H	1108	1193	500.00
†102	2½ to 10 in., R. H	1510	1600	700.00
*104	2½ to 10 in., R. H	1520	1600	700.00
*106	2½ to 10 in., R. and L	1560	1650	750.00
†107	2½ to 12 in., R. H	2500	2700	900.00
*108	2½ to 12 in., R. and L	2550	2750	1000.00

Nos. 30 to 37 have no cut-off attachment unless especially ordered.

*Pressure feed machine. †Lead screw machine.

*Pressure feed machine. †Lead screw machine

These prices include counter-shaft, ratchet wrench and pipe rest. Nos. 70 to 77 have no cut-off attachment unless especially ordered.



ACME 1½ INCH SINGLE BOLT CUTTER.

CLASS A.

This style of machine is built in five sizes:

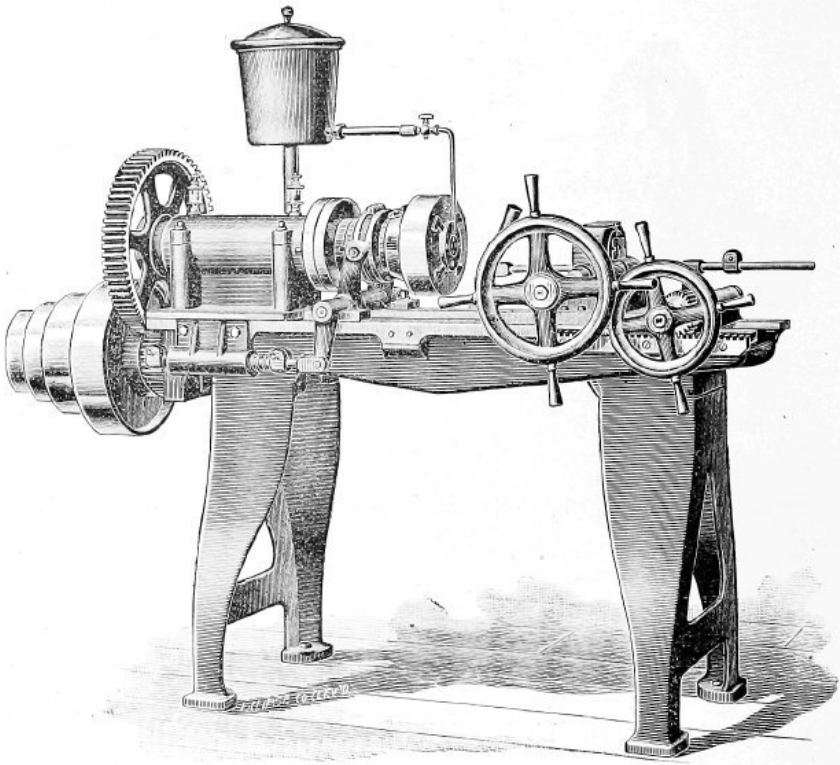
½ inch, suitable for threading and tapping	¼ to ½ inch.	Price complete	$250 00
1 " " " " " "	¼ to 1 "	" "	350 00
1¼ " " " " " "	⅜ to 1¼ "	" "	375 00
1½ " " " " " "	⅜ to 1½ "	" "	400 00
2 " " " " " "	⅜ to 2 "	" "	550 00
Extra Dies without caps for machines ½, 1, 1¼ and 1½ inches		per set,	1 50
" " " " " "	2 inches	"	1 75
" Hardened Steel Caps for "	½, 1, 1¼ and 1½ inches	"	2 00
" " " " " "	2 inches	"	2 50

These machines will work either right or left hand.

Speed of countershaft, with 16x4 inch pulleys, from 200 to 225 revolutions per minute, according to size.

When ordering please mention style of threads required.

We will be pleased to furnish any further particulars, floor space required, weight, etc.



ACME 1½ INCH SINGLE BOLT CUTTER.

CLASS B.

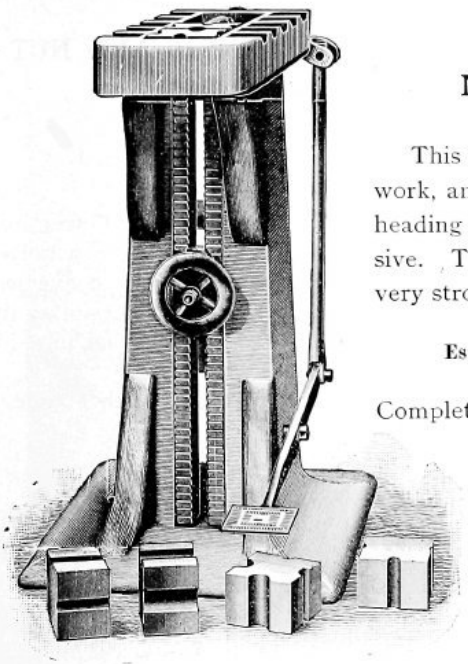
This style of machine is built in three sizes:

1 inch, suitable for threading and tapping ¼ to 1 inch.	Price complete.....	$300 00
1¼ " " " " " " ⅜ to 1¼ "	" "	325 00
1½ " " " " " " ⅜ to 1½ "	" "	350 00
Extra Dies without caps.....	per set,	1 50
Extra Hardened Steel Caps.....	"	2 00

These machines will work either right or left hand.

Speed of countershaft, with 16x4 inch pulleys, from 225 to 250 revolutions per minute, according to size.

When ordering, please mention style of threads required.



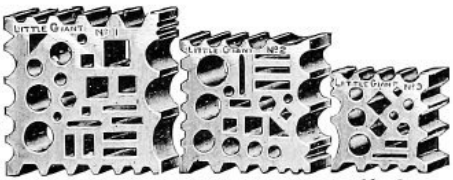
No. 8 BOLT HEADER.

This Bolt Header is intended for heavy work, and is furnished with STEEL DIES for heading bolts from ½ to 1½ inches inclusive. Takes bolts to 26 inches long. A very strong machine.

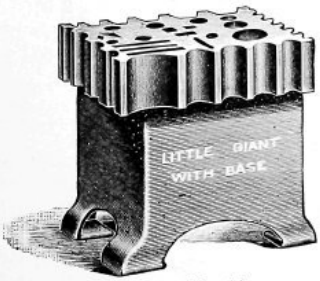
Especially Adapted for Marine Use.

Complete..... $75 00

"LITTLE GIANT" SWAGE BLOCKS.



No. 1. No. 2. No. 3.



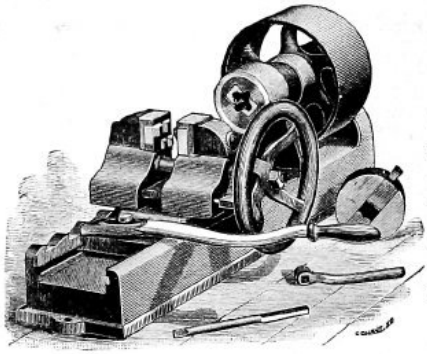
No. 11.

PRICE LIST AND SIZES.

No.	Size.	Not Planed.	Planed Both Sides.
1	18x18x4.....	$11 00	$13 00
2	15x15x4.....	7 00	8 50
3	11x11x4.....	4 00	5 00
11	18x18x4x16 high.....	15 50	17 50
12	15x15x4x16 "	12 00	13 50
13	11x11x4x16 "	7 25	8 25

Unless otherwise ordered, Swage Blocks will be sent NOT PLANED.

"LITTLE GIANT" POWER BOLT CUTTERS AND NUT TAPPERS.



This cut shows our new Power Bolt Cutter and Nut Tapper, arranged for bench. This makes a convenient machine, and in many places takes the place of a higher-priced machine. It cuts to ⅝ inch inclusive.

Pulley on spindle 4 inches wide, 8 inches diameter.

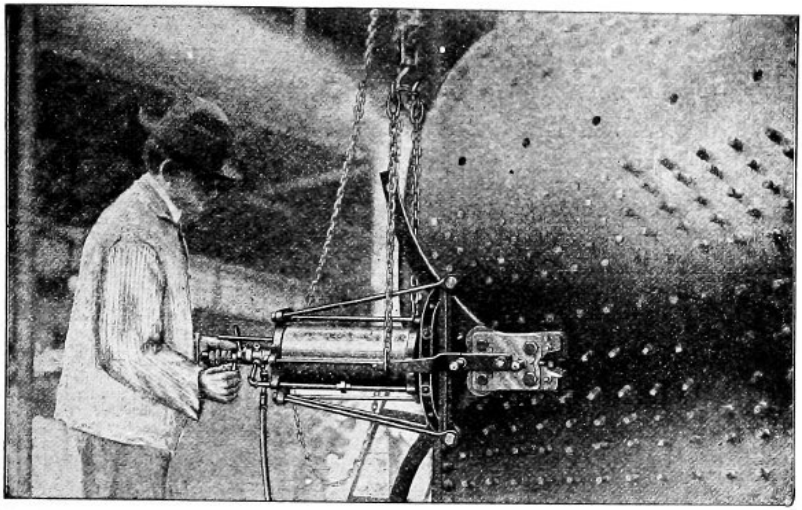
	Price.
Machine without Taps, Dies, and Collets, or Tap Chuck	$25 00
Plain Countershaft	15 00
Friction Clutch Countershaft	20 00
Tap Chuck	8 00
Legs, extra	7 00

Prices of Taps, Dies, and Collets, also Solid Pipe Dies.

Diameter, inches.	Number of Threads to inch, "V" Form.	Machine Taps, Each.	Adjustable Dies, Each, without Collets.	Adjustable Die, Tap, and Collet, Per Set.	Solid Pipe Dies, without Collets.
¼	18, 20	$0 60	$1 00	$2 60	$2 00
5/16	16, 18	70	1 00	2 70	....
⅜	14, 16	80	1 25	3 05	2 00
7/16	14	90	1 25	3 15	....
½	12, 13	1 00	1 50	3 50	2 00
9/16	11, 12	1 15	1 50	3 65	....
⅝	10, 11, 12	1 30	1 75	4 05	....

		Price.
Collets, ¼ to ¾ (for Adjustable Dies) incl.	each,	$1 00
" for solid Dies	"	1 50
" " Pipe "	"	1 50
" Caps, ¼ to ¾	"	80
" Guides, ¼ to ¾	"	20

PATENT PNEUMATIC STAYBOLT CLIPPER.



Cuts off 1¼ inch staybolts, and less, with ease and great rapidity, any desired length.

It weighs but 170 lbs. and is easily handled.

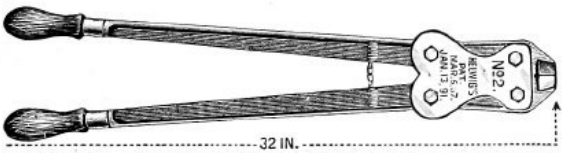
It is suspended from a light boiler crane, permitting the operator to move it about very readily from one bolt to another.

This machine is very strong and is compactly built, requiring but little space in which to operate it.

It has INSERTED KNIVES, which, when worn, can be REPLACED AT SMALL COST.

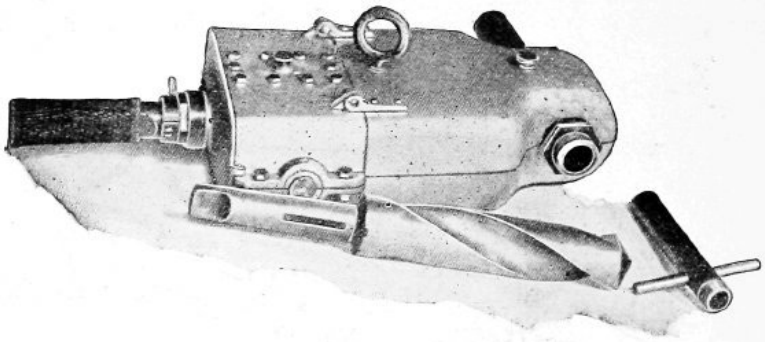
Price.....$300 00

HELWIG BOLT AND RIVET CLIPPERS.



No.	1	2	3	4	5
Weight, lbs	15	7½	5	2½	1½
Length, inches	40	32	26	18	9
Will cut bolts, inches	¾ & less	9/16 & less	½ & less	⅜ & less	5/16 & less
Price	$13 00	$9 00	$7 00	$5 00	$3 70

REVERSIBLE PNEUMATIC MOTOR.



We use but 10 balls between thrust end of drill socket and feed post; no thrust or pressure is sustained by the frame. Other drills have from 100 to 200 balls.

For DURABILITY our drills are unexcelled. They will run over a year, with very slight or no repairs, if they are given proper care, and are always ready. The cylinders are closed at both ends so that no dirt or dust can have access. All other makes are single-acting and have one end open.

Please note that our drill is of PISTON type, not rotary. Pneumatic drills are operated by compressed air which is governed by the same natural laws as steam. Any engineer knows that the rotary steam engine was never a success, and for the same reason a rotary air motor cannot be. It gives large frictional indicator diagrams and is very wasteful in consumption of air.

Style.	No.	Weight.	Cubic feet Free Air per Minute.	Maximum Capacity 80 lbs. Pressure.	Morse Skt.	Rev. per M.	Price.
A. End Drill.....	1	35 lbs.	18	2½ in. Drill	4	140	$150 00
A. " "	2	30 "	16	2 " "	4	170	145 00
B. Cent'l Drill.....	3	29 "	18	1¾ " "	4	210	140 00
B. " "	4	27 "	16	1¼ " "	3	250	130 00
Wood Boring Drill...	6	20 "	12	3 " Auger	Diam. ½ in.	500	130 00

The consumption of air stated in the above table is the actual amount used when the drill is in service under 80 lbs. pressure.

All our DRILLS are of the piston type, are valveless, have double-acting cylinders, and are reversible. They are made of bronze brass and steel, and of the best material throughout.

Style of Short Stroke Hammers.

BOYER PNEUMATIC HAMMERS.

Style of Long Stroke Hammers.

Size Number.	Adapted to.	Weight Each.	Price Each.
1	For heavy chipping and calking and light riveting	10 lbs.	$125.00
2	General calking and chipping	9 "	125.00
3	Flue beading and calking	8 "	125.00
A	Heavy chipping, calking and light riveting	10 "	106.25
B	General calking and chipping	9 "	106.25
BB	Light chipping and calking	7 "	93.75
0	Extra heavy chipping. Will drive rivets up to ⅝ inch	12 "	125.00
80	Long stroke, single valve, drive ⅝ to 1¼ rivets, steam tight boiler work	20 "	187.50
60	Long stroke, single valve, drive rivets up to ⅞, car bridge and ship building	17 "	187.50

No. 80 riveting hammers, equipped with improved lock and automatic safety valve, the latest, simplest and most improved hammer made, 3 finished rivet sets included.

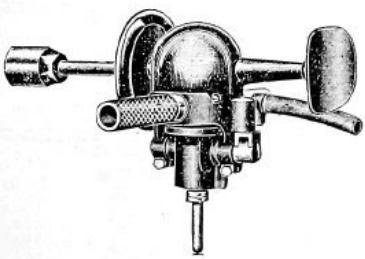
No. 60 hammer is particularly adapted to shipbuilding, bridge, car, tank and structural work; 3 finished rivet sets furnished with each hammer.

The automatic valve on our Nos. 80 and 60 machines prevents the hammer from starting until in place against the work, thus avoiding the objectionable feature of danger to workmen and losing the rivet sets.

EXTRAS.

Boyer Pneumatic Holder-on.....each, $31.25
Rivet Sets for Long Stroke Hammers, Fin.. " 2.25
Round Chisel Blanks, Nos. 1, 2, 3 Hammers, each, 8 .65
Sizes A, B and C Ford Dolly Bars..... " 31.25
Hex. Chisel Blanks, Nos. 1, 2, 3 Hammers.....each, $0.75

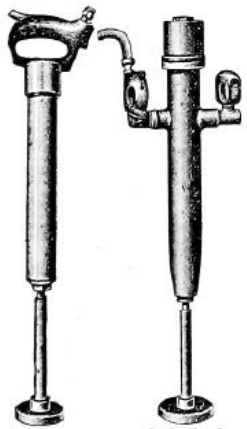
No. 4 CHICAGO BREAST DRILL.



This breast drill is especially adapted to drilling test holes in stay bolts and other light drilling. Can be fitted with feed screw. Weight, 8 lbs.

No. 16 is for a similar purpose. Drills up to ⅛ inch in metal. Can also be fitted with feed screw. Weight, 8 lbs.....price, $62.50

Boyer Piston Air Drills, Tynan Deck Boring and Side Light Cutters, Stone Hammers, Scaling Machines furnished. Prices, etc., on application.



Style No. 7. Style No. 8.

PNEUMATIC FOUNDRY AND CONCRETE RAMMERS.

By the use of these machines one man can readily do the work of from four to twelve using the old style rammers.

It is not only the great rapidity which makes these tools popular, but the fact that the molds may be rammed much harder than is usually accomplished by hand labor.

Straining in the mold avoided entirely.

No. 7 is designed for ramming up flasks.

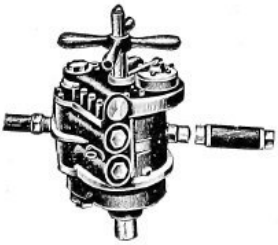
No. 8 or large hand size for large flasks or pit work.

No. 9 or crane rammer for heavy castings in pits, etc.

Number.	Weight.	Number of Blows.	Air Pressure, lbs.	Air Used per Minute.
7	18	250 to 350	60 to 80	11
8	45	250 to 300	80 to 100	12
9	300	250 to 300	80 to 100	25

NEW LITTLE GIANT PISTON AIR DRILLS

NON-REVERSIBLE.



Style of Nos. 0, 1, 2, and 4.

No. 3 Screw Feed.

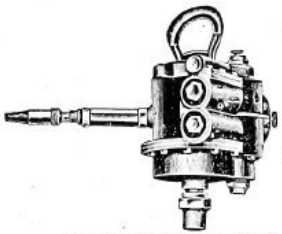
No. 3. Combination Breast Drill, Screw Feed Drill, and Wood Boring Machine.

SPECIAL FEATURES: Extreme Simplicity of Construction, Economy in the Use of Air, Absolute Freedom from Vibration.

They are more powerful than any other machine in proportion to their weight.

No.	Adapted to	Drill Spindle Taper Socket.	Speed Light. R. P. M.	Weight, lbs., Each.	Price Each.
0	3½ H. P., ex. heavy drilling, reaming, tapping and boring cylinders.	Nos. 4 & 5 Morse.	230	60	$187.50
1	Drilling up to 2½ in. diam., reaming and tapping up to 2 in. in diam.	No. 4 "	230	38	168 75
2	" " 1¼ " " " " " 1 " "	" 3 "	310	32	156.25
3	Combination, cap. ⅞ diam. in steel, 1 in. in oak	" 1 "	1100 & 700	8	125.00
4	Cap. ⅝ in steel, for stay bolt and light tapping and reaming	" 2 "	400	14	156.25

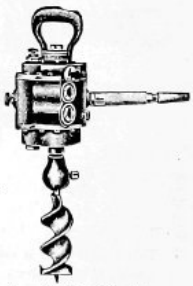
Nos. 0, 1, 2 Drill, non-reversible, can be made reversible, $12.50 extra.



Nos. 11 and 12 Machine for Steel.

REVERSIBLE FLUE ROLLING, REAMING, TAPPING AND WOOD BORING MACHINES.

Can be reversed running at full speed and bit withdrawn instantly.

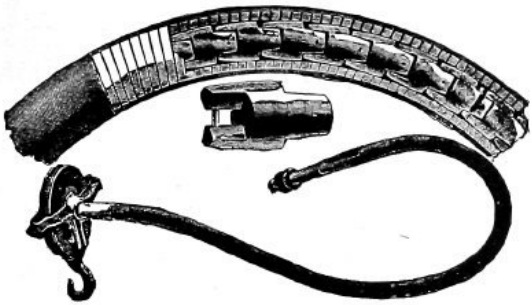


Nos. 5 and 14 for Wood.

No.	Adapted	Speed Light. R. P. M.	Weight, lbs., Each.	Price Each.
11	Reaming, tapping and flue rolling, cap. 1¼ stay bolts, and 4 in. flues	400	38	$168.75
12	" " " " " " " 1 " " " 3 "	450	28	156.25
5	Cap. 2½ in. diam. in oak, any depth	670	13	156.25
14	" 3 " " " "	700	28	156.25

No. 14 can be made double geared, 4 to 1 or 6 to 1.

THE GEM FLEXIBLE SHAFT.



The strongest, easiest running Shaft manufactured, combined with the feature of being easily repaired in case of accident, the core of which is composed of segments made of gun metal which is encased in square steel wire made and tempered especially for this specific purpose, which in turn is covered with specially prepared rubber warranted to withstand 350 degrees of heat, and to be unaffected by the soft grease used in lubricating the core. Where it can be conveniently done, it is advisable, when running at excessively high speed for a great length of time, to run a small stream of water through the casing, for which purpose it can be arranged. This will prevent any possible overheating.

Be particular to state whether you wish shaft to run right or left handed, or in both directions.

Prices for regular size shaft, with the attachments shown in cut, are as follows:

Designating No.	Diameter of Core in inches.	Length of Regular Section in feet.	Price complete as shown in cut.	Price per foot for extra length.
3	½	5	$ 30 00	$ 3 00
4	⅝	6	40 00	3 75
4½	¾	7	45 00	4 00
5	⅞	7	50 00	4 50
6	1	8	60 00	5 25
8	1¼	8	80 00	8 25
9	1⅜	8	100 00	12 00

GRANITOID AND CEMENT SIDEWALK TOOLS.

Maurer's Steel Rammers.

Complete with 2 in. x 4 ft. Handle.

	PER DOZEN.
8 x 8 x ¾ in.,	$52.80
10 x 10 x ¾ in.,	57.60
11 x 11 x ¾ in.,	60.00
12 x 12 x ¾ in.,	62.40
5 x 5 x ½ in.,	42.00
6 x 6 x ½ in.,	48.00
7 x 7 x ½ in.,	51.60
10 x 10 x ½ in.,	62.40
8 x 8 x ⅝ in.,	57.60
3 x 6 x ⅝ in.,	42.00
11 x 11 x ⅝ in., Curved,	67.20
12 x 12 x ⅝ in., Curved,	69.60

Maurer's Edge Groovers.

With Adjustable Side Plate.

	PER DOZEN.
¼ in.,	$ 72.00
⅜ in.,	72.00
½ in.,	72.00
⅝ in.,	72.00
¾ in.,	78.00
1 in.,	78.00
1½ in.,	96.00
2 in.,	108.00

Without Side Plate.

	PER DOZEN.
¼ in.,	$38.40
⅜ in.,	38.40
½ in.,	38.40
⅝ in.,	38.40
¾ in.,	38.40
1 in.,	38.40
1½ in.,	48.00
2 in.,	60.00

Maurer's Cutting Tools.

PER DOZEN.

7 x 4½ in. Blade with 11 in. Hickory Handle, . . . $60.00

Nos. 1 and 2.

Nos. 3 and 4.

Maurer's Brass Rollers for Sidewalks. PER DOZEN

	PER DOZEN
No. 1—3½ in., for Roughing, with Frame and Handle,	$192.00
No. 2—7 in., for Roughing, with Frame and Handle,	336.00
No. 3—3½ in., for Fancy Walks, with Handle, 1 Frame for 3½ in. only,	312.00
No. 4—7 in., for Fancy Walks, with Handle, 2 Frames for 3½ and 7 in.,	528.00

Maurer's Finishing Tools.

PER DOZEN.

For **Curves and Gutters,** $42.00

PER DOZEN.

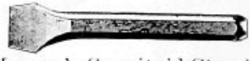
For **Stable Gutters,** $42.00

Maurer's Sidewalk Groovers. PER DOZEN.

	PER DOZEN.
No. 1—⅛ in. Inserted Hardened Steel Center Plates, .	$48.00
No. 2—3/16 in. Inserted Hardened Steel Center Plates, .	54.00
No. 3—Without Center Plates,	30.00
No. 4—⅛ in. Inserted Steel Center Plates, Small Radius on End, ...	48.00

Maurer's Carriage Groovers. PER DOZEN.

	PER DOZEN.
No. 5—With Inserted Steel Center Plates, ...	$62.40
No. 6—With Cast Iron Center Plates, ...	38.40
No. 7—With Adjustable Steel Center Plates, ...	86.40



Maurer's Granitoid Chisels.

PER DOZEN

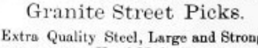
1½ in. Cut, 9 in. Long, ⅞ in. Steel, $8.40

Maurer's Handled Groovers. PER DOZEN.

	PER DOZEN.
Curved Blade, with Hickory Handle, ...	$42.00
Straight Blade, with Hickory Handle, ...	42.00
Extra Blades for above, .	21.00

Maurer's Cutting Knives or Tools, with Handle.

	PER DOZEN.
18 x 4½ in. Blade, .	$ 90.00
24 x 4½ in. Blade, .	108.00



Granitoid Sidewalk and Granite Street Picks.

Extra Quality Steel, Large and Strong, Hand Made.

Pounds, .	**8**	**9**	**10**
Per dozen, .	$24.50	26.50	28.5[illegible]

Maurer's Mixing Boxes.

PER DOZEN

4 x 8 ft., 12 in. High, Steel Bottoms and Top Edges, Lined with 3/16 in. Iron, . . . $288.0[illegible]

MOULDERS' TOOLS.

HEART AND SQUARE.

Width, inches..	¾	1	1¼	1½	1¾	2
Per dozen	$4 80	5 40	6 60	7 80	9 00	10 20

HEART AND LEAF.

Width, inches	1	1¼	1½
Per dozen	$5 40	6 60	7 80

HEART AND SPOON.

Width, inches	1	1¼	1½
Per dozen	$5 40	6 60	7 80

TAPER AND SQUARE.

Width, inches	¾	1	1¼	1½
Per dozen	$4 80	5 40	6 60	7 80

TAPER AND SPOON.

Width, inches	1	1¼	1½
Per dozen	$5 40	6 60	7 80

SPOONS.

NO I

NO. 2.

Width, inches	1	1¼	1½
Per dozen	$5 40	6 60	7 80

STOVE TOOLS.

Width, inches	⅜	½	⅝	¾	1
Per dozen	$4 80	5 40	6 00	6 60	7 80

BENCH LIFTERS.

Width, inches	⅜	½	⅝	¾
Per dozen	$4 80	5 40	6 00	6 60

SQUARE TROWELS.

Length, inches	4	4½	5	5½	6
Width, 1 in., per doz.	$5 40	6 00	6 60	7 20	7 80
" 1¼ " " "	5 40	6 00	6 60	7 20	7 80
" 1½ " " "	6 60	7 20	7 80	8 40	9 00
" 1¾ " " "			9 00	9 60	10 20
" 2 " " "			10 20	10 80	11 40

FINISHING TROWELS.

NO. 1.

NO. 2.

Length, inches	5	5½	6
Width, inches.	1¼	1¼	1¼
Width, inches.	1½	1½	1½

Same price as Square Trowels.

HEART TROWELS.

Width, inches	2	2¼	2½	3
Per dozen	$6 00	7 50	9 00	12 00

YANKEES.

Width, inches.	½	⅝	¾	1
Per dozen	$5 40	6 00	6 60	7 80

SQUARE STRAIGHTS.

Width, inches.	½	⅝	¾	1
Per dozen	$5 40	6 00	6 60	7 80

DOUBLE SQUARES.

Width, inches.	½	⅝	¾	1
Per dozen	$5 40	6 00	6 60	7 80

OVAL DOG TAILS.

Width, inches.	¾	1	1¼
Per dozen	$6 00	6 75	8 25

BEADS.

Width, inches	½	⅝	¾
Per dozen	$5 40	6 00	6 60

MOULDERS' TOOLS.—

FLUTES.

Width, inches	⅜	⅝	⅞
Per dozen	$6 00	7 20	8 40

HALF ROUND CORNERS.

Width, inches	1	1¼	1½	2
Per dozen	$6 00	6 00	6 00	6 00

SQUARE CORNERS.

Width, inches	2	2½	3
Per dozen	$6 00	6 00	6 00

INSIDE SQUARE CORNERS.

Width, inches	2	2½	3
Per dozen	$9 00	9 00	9 00

PIPES.

Per dozen, ... $4 80

CIRCULAR FLANGE.

Width, inches	½	⅝	¾	1
Per dozen	$9 60	10 80	12 00	14 40

FLAT FLANGE.

Width, inches	½	⅝	¾	1
Per dozen	$9 60	10-80	12 00	14 40

FLAT AND CIRCULAR FLANGE.

Width, inches	½	⅝	¾	1
Per dozen	$9 60	10 80	12 00	14 40

HUB TOOLS.

Width, inches.	¾	1
Per dozen.	$9 00	10 80

LIFTERS.

Per Dozen.

	10	12	14	16	18	20
⅛ x	$4 20	4 80	5 40	6 00		
¼ x	4 20	4 80	5 40	6 00		
⅜ x	4 80	5 40	6 00	6 60		
½ x	5 40	6 00	6 60	7 20	7 80	
⅝ x		6 60	7 20	7 80	8 40	
¾ x		7 20	7 80	8 40	9 00	9 60
1 x			9 00	9 60	10 20	10 80

FLANGE LIFTERS.

½ x 14	½ x 16	⅝ x 14	⅝ x 16	¾ x 14
$10 80	11 40	11 40	12 00	12 00
¾ x 16	¾ x 18	1 x 16	1 x 18	1 x 20
$12 60	13 20	15 00	15 00	16 20

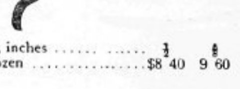
HUB LIFTERS.

½ x 12	½ x 14	½ x 16	¾ x 14	¾ x 16
$6 00	6 60	7 20	7 80	8 40
¾ x 18	1 x 16	1 x 18	1 x 20	
$9 00	9 60	10 20	10 80	

BOX LIFTERS.

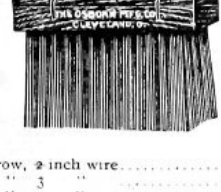
⅝ x 14	⅝ x 16	⅝ x 18	¾ x 16	¾ x 18	¾ x 20
$13 20	13 80	14 40	14 40	15 00	15 60

FLANGE AND BEAD.



Width, inches	½	⅝	¾	1
Per dozen	$8 40	9 60	10 80	13 20

Plain Steel Wire Casting Brushes.

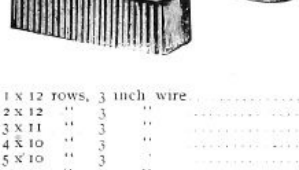


		List Per Gross.
No. 1	—4-row, 2 inch wire	$ 36.00
" 2	—4 " 3 "	42.00
" 3	—4 " 4 "	48.00
" 4	—4 " 5 "	54.00
" 5	—5 " 2 "	39.00
" 5½	—5 " 2½ "	42.00
" 6	—5 " 3 "	45.00
" 7	—5 " 4 "	51.00
" 8	—5 " 5 "	57.00
" 9	—5 " 6 "	63.00
" 9A	—6 " 3 "	52.00
" 9B	—6 " 4 "	60.00
" 9C	—6 " 5 "	68.00
" 9D	—6 " 6 "	76.00

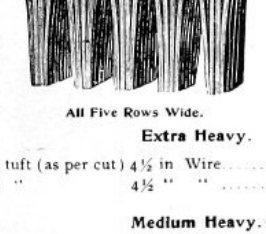
Round Steel Wire Casting Brushes.

		List Per Gross
No. 10	—3 inch diam. 5 in wire	$ 42.00
" 11	—3 " 6 "	45.00

Gear Brushes.



"The Acme" Steel Wire Casting Brushes.



All Five Rows Wide.

		List Per Gross.
No. 12,	1 x 12 rows, 3 inch wire	$ 26.00
" 13,	2 x 12 " 3 "	34.00
" 14,	3 x 11 " 3 "	42.00
" 15,	4 x 10 " 3 "	47.00
" 16,	5 x 10 " 3 "	56.00
" 17,	1 x 12 " 4 "	28.00
" 18,	2 x 12 " 4 "	38.00
" 19,	3 x 11 " 4 "	47.00
" 20,	4 x 10 " 4 "	51.00
" 21,	5 x 10 " 4 "	62.00

We make these Brushes with any required length of wire, or any number of rows.

Extra Heavy.

			List Per Gross.
No. A,	5 tuft (as per cut)	4½ in Wire	$ 90.00
" B,	4 "	4½ " "	78.00

Medium Heavy.

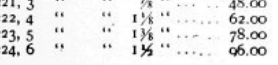
No. C,	5 tuft (as per cut)	4½ in Wire	$ 80.00
" D,	4 "	4½ " "	68.00

Moulders' Soft Dusters or Dry Brushes.

Wire Drawn.

	Block	Rows.	Trim.	List Per Gross.
No. 0200,	9⅛ x 1¼ in.,	4, Pure Black Hair	2⅞ in	$ 42.00
" 200XX,	8½ x 1½ "	4, Mixed "	3 "	50.00
" 200X,	" x " "	4, Pure Gray "	2⅞ "	80.00
" 200,	" x " "	4, " " "	3¼ "	90.00
" 201,	" x " "	4, Russia Bristle	3½ "	140.00
" 205,	10 x 2 "	5, Pure Black Hair	3½ "	80.00
" 208,	8¾ x 2⅞ "	5, " " "	2½ "	72.00
" 208S,	" x " "	5, " Gray "	3¼ "	96.00
" 208B,	" x " "	5, American Bristle	2½ "	120.00
" 8361,	" x " "	5, Mixed Russia Bristle	3¼ "	156.00
" 8421,	" x " "	5, " American "	2⅝ "	114.00

Core Box Brushes.



Pure Stiff Russia Bristle.

12 in. Handle. Length of Bristle, 1 inch.

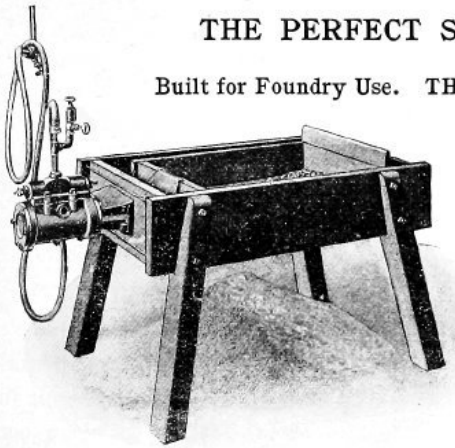
				List Per Gross.
No. 220,	2 rows,	width	⅝ in	$ 36.00
" 221,	3 "	"	⅞ "	48.00
" 222,	4 "	"	1⅛ "	62.00
" 223,	5 "	"	1⅜ "	78.00
" 224,	6 "	"	1½ "	96.00

PLUMBAGO OR BLACK-LEAD CRUCIBLES.

Nos.	Holding Capacity, Liquid Measure.			Height Outside.	Diameter at the Top Outside.	Diameter at the Bilge Outside.	Diameter at the Bottom Outside.	PRICES.
	GAL.	QT.	PT.	INCHES.	INCHES.	INCHES.	INCHES.	
0				2	1 1/2	1 5/8	1 1/4	$1.80 per Doz.
00				2 3/8	1 7/8	1 7/8	1 3/8	1.80 " "
000				2 1/2	1 7/8	2 1/8	1 1/2	1.80 " "
0000				3	2 3/8	2 1/2	1 3/4	1.80 " "
1				3 5/8	3 1/8	3	2 1/4	25 cents each.
2				4 1/2	3 3/4	3 5/8	2 3/4	30 " "
3				5 1/4	4 1/4	4 1/8	3	35 " "
4				5 5/8	4 5/8	4 1/2	3 1/4	40 " "
5			1 1/2	6	4 7/8	4 3/4	3 1/2	45 " "
6		1		6 1/2	5 1/4	5 1/8	3 3/4	50 " "
7		1	1/4	6 3/4	5 1/2	5 1/2	4	55 " "
8		1	1/2	7 1/4	5 3/4	5 3/4	4 1/4	60 " "
9		1	3/4	7 5/8	6	6 1/4	4 1/2	65 " "
10		1	1	8	6	6 1/2	4 3/4	70 " "
12		2		8	6 1/4	6 3/4	5	
14		2	1	8 1/2	6 3/4	7 1/4	5 1/2	
16		2	1	8 3/4	7	7 1/2	5 1/2	
18		3	1	9 3/4	7 3/8	8	5 3/4	
20	1			10 1/4	7 3/4	8 3/8	6	
25	1		1	10 1/4	8	8 5/8	6 1/4	
30	1	1	1	11	8 5/8	9 1/4	6 1/2	
35	1	2	1	11 5/8	9 1/4	9 3/4	7	
40	2			12 3/8	9 1/4	10 1/4	7 3/4	
45	2	1		13	9 3/4	10 1/2	7 5/8	No. 12
50	2	3		13 1/2	10 1/8	11 1/4	7 7/8	
60	3			14	10 3/8	11 5/8	8	and upwards
70	3	1		14 1/2	10 7/8	12	8 1/4	
80	3	2	1	15 3/8	11 1/8	12 3/8	8 5/8	6 1/2 cents
90	4			15 7/8	11 1/2	12 1/2	9	
100	4	2	1	16	11 7/8	13 1/8	9 3/8	per number.
125	4	3	1	16 5/8	12 1/2	13 3/4	9 1/2	
150	6	3		18 1/4	13 1/4	14 3/4	10 3/8	
175	7	3	1	19 1/2	14 1/4	15 3/4	10 3/4	
200	9	3	1	20 1/2	15	16 1/2	11 1/4	
225	10	1	1	20 3/4	15 1/4	16 3/4	12 1/2	
250	10	3		20 1/2	15 1/4	17	11 3/4	
275	11	3		22 3/8	15	16 5/8	12 1/2	
300	12	2		22	16 1/4	17 1/2	12 1/2	

THE PERFECT SAND SIFTER.

Built for Foundry Use. THE LATEST AND BEST.



Will do the work of eight men.

Operated either by steam or air.

Fitted with patented heavy screen which will not give out.

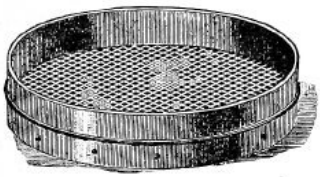
Size of screen 18x30 inches.

Weight 150 lbs.

List.....$100 00

FOUNDRY RIDDLES, SCREENS, ETC.

FOUNDRY RIDDLES.



Brass—2 to 18 mesh, 18 inches....	Per dozen,	$14 00
Galvanized—2 to 12 mesh, 18 inches.	"	9 50
Steel—2 to 24 mesh, 18 inches.....	"	7 50

SAND SCREENS.

ORDINARY SAND SCREEN.

Outside measure, 5½ feet high, 24 inches wide, frame 1⅛ inch thick; 2, 3, 4, 5, 6 mesh...Per dozen, $33 00

EXTRA SAND SCREEN.

Outside measure, 6 feet high, 26 inches wide, frame 1¾ inch thick; 2, 3, 4, 5, 6 mesh...Per dozen, $40 00

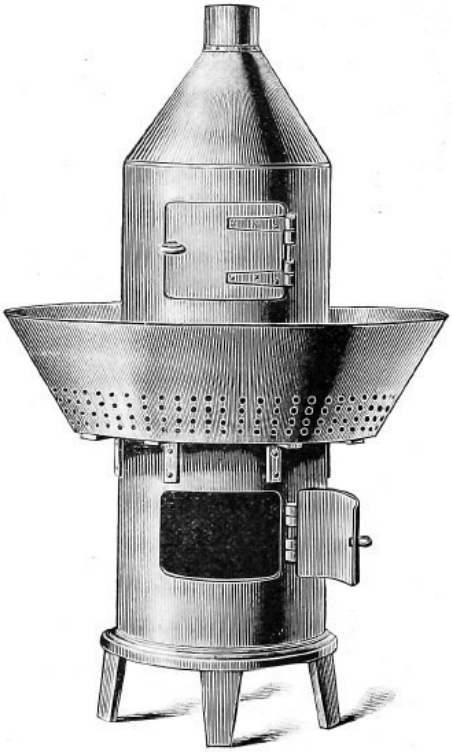
HARD WOOD BENCH RAMMERS.

Per pair $0 80

FLOOR RAMMERS COMPLETE.

Floor Rammer, Complete .....Per dozen, $12 00 to $15 00
Rammer Handles .....Per dozen, 2 00
Polished Iron Butts and Peans. ..Per pound, 10

THE HANDY SAND STOVE.



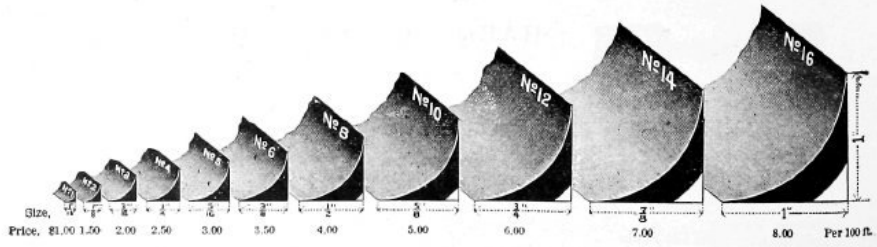
JUST THE THING to furnish sand for three or four locomotives.

DIMENSIONS—20 inches diameter, 3 feet high. Door at top to put in fuel; door at bottom to clean out ashes and start fire. All of steel except the grate. The sand runs out as fast as it dries. Weight complete, 275 lbs.

Price.....$50 00

LEATHER FILLET.

Conforms and adjusts as easily to single and compound curves as to straight work. Put up in lengths of 4 feet, and packages of 100 feet.



ECLIPSE STEEL WIRE COAL SCREENS.

For Screening Coal, Coke, Gravel, Etc.

Plain, with headboard.

Plain, with Headboard.

No. 10. Extra, 34x76 inches.....each, $15.00
No. 20. Regular, 31x69 inches..... " 12.00
Weight, extra, about 101 lbs.; regular, 86 lbs.

With Footboard and Leg.

No. 1. Extra, 34x81 inches.....each, $17.25
No. 2. Regular, 31x74 inches..... " 14.25
Weight, extra, about 148 lbs.; regular, 106 lbs.

In ordering, do not fail to mention the size mesh (hole) wanted. All meshes are furnished at same price.

With footboard and leg.

TELESCOPE WAGON SHUTES.

8 feet long, 5 foot slide, available length 12 feet, each..... $13.50
10 feet long, 7 foot slide, available length 16 feet, each..... 18.00
12 feet long, 9 foot slide, available length 20 feet, each..... 22.50

The telescope shute, with an extension piece that slides over the outside of the straight section, permits adjustment to any desired length within the limit of the extension, an advantage not obtained by using taper shutes with extensions. Slides are uniform width, 12 inches.

TAPER WAGON SHUTES.

For Hard Coal.

8 feet long, width at top 21 inches, bottom 12 inches, each..... $6.00
10 feet long, width at top 21 inches, bottom 12 inches, each..... 7.50
12 feet long, width at top 21 inches, bottom 12 inches, each..... 9.00
Special lengths can be furnished to order.

EXTENSIONS FOR ABOVE SHUTES.

Available length, 6 feet.....each, $4.50
" " 8 " ..... " 6.00
" " 10 " ..... " 7.50

These extensions are about 12 inches wide, and extend over the small end of a taper shute about a foot. They also fit each other, hence as many lengths can be added as desired. No extra support is required. Special lengths made to order at proportionate price.

STEEL WAGON BOX BOTTOMS.

Pieces cut to order.....per square foot, $0.18
Can furnish in one sheet, 44x144 inches or smaller.

In ordering, state full size of wagon box bottom outside. It should extend under the sides, hence in applying remove the sides and make holes for bolts, then screw the sides down securely, which is all required to hold the bottom in position. These steel bottoms protect the wagon bottom and form a smooth surface without obstruction to a shovel, which greatly facilitates unloading and thus saves time.

BAMBOO COAL BASKETS.

Extra Strong.

Shows bottom of basket, reinforced with iron straps.

BAMBOO, NAILED RIMS, IRON STRAPPED.

Capacity 1 bushel, 17½ inches diameter, 12½ inches deep.....per doz., $18.00
Capacity 1½ bushels, 20 inches diameter, 14 inches deep.....per doz., 21.00
Capacity 2 bushels, 21 inches diameter, 17 inches deep.....per doz., 27.00
Weight per dozen, 1 bu., 72 lbs.; 1½ bu., 84 lbs.; 2 bu., 45 lbs.

STEEL APRONS.

For Use with Wagon Shutes.

23 inches wide, 21 inches high.....each, $1.13

These are intended to protect the building when unloading coal. They rest on the shute, being provided with hooks to hold them in place.

CHALLENGE OAK COAL BASKETS.

Shows bottom of basket, reinforced with wood.

Capacity 1 bushel, 17½ inches diameter, 12½ inches deep.....per doz., $12.00
Weight, 60 lbs. per dozen.

Nos. 1-4.

ZELNICKER JAPANESE FIBRE AND RATTAN BROOMS.

For Factory, Mill, Warehouse and Stable use.

Experience has shown that these brooms are peculiarly adapted for all kinds of coarse and heavy sweeping. They possess all the good points of a corn broom and in addition they are much stronger—better and last longer. They *will not curl* and get lop-sided.

No. 1.	Japanese fibre, 30 lbs..... per doz.,	$7 50
No. 2.	" " 33 " ..... "	8 25
No. 4.	" " and rattan, 33 lbs., "	9 00

NAILED STEEL-BAND WAREHOUSE AND MILL BROOMS.

No. 8. Corn and rattan mixed, 33 lbs...per doz., $7 50

RATTAN AND BAMBOO BROOMS.

For Tracks and Switches of Steam and Electric Railways.

No. 11.	All rattan, with plain handle.....per doz.,	$10 50
No. 12.	" " " chisel " ..... "	12 00
No. 13.	Heavy rattan, with plain handle.. "	13 00
No. 14.	Extra " " chisel " .. "	14 25
No. 15.	Rattan and bamboo with plain handle"	8 25
No. 16.	" " " " chisel " "	9 75

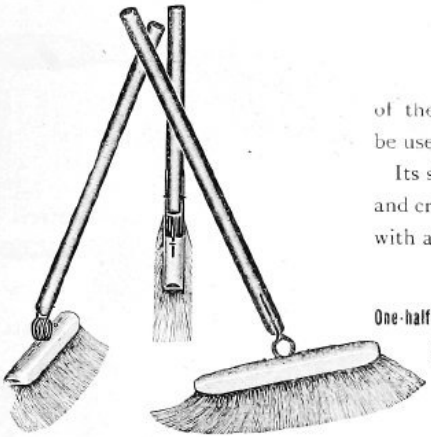
Any of the above with chisel handles...per doz., extra, $1 50

No. 16.

RAILROAD AND WAREHOUSE CORN BROOMS.

Warehouse,	4	sewed,	26 lbs....	per doz.,	$5 50
" heavy,	5	"	30 "	"	6 00
" extra heavy,	5	"	33 "	"	6 50
Railroad, heavy,	5	"	36 "	"	7 50
" extra heavy,	5	"	40 "	"	8 50

The Iwanta Broom



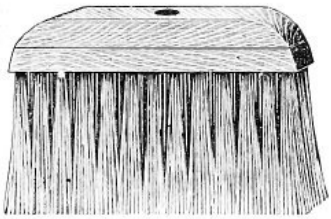
The illustration gives a clear idea of the manner in which this broom can be used.

Its shape permits cleaning the corners and crevices which are impossible to reach with any ordinary broom.

Face size 16x1¾ inches.

One-half dozen in crate. **Per dozen $9.00**

Brewers' Upright Fibre Brooms.



Solid Block or Brass Wire Drawn.

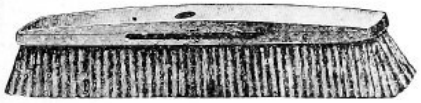
Solid Block always furnished unless otherwise specified.

These Brooms are made of the best fibre, are not effected by water and are suitable for both sweeping and scrubbing.

		List Per Gross
No.	240, 12 in. 2 rows, 5 in. trim, Coir or Bassine	$ 80.00
"	241, 12 " 3 " 5 " " " " "	105.00
"	242, 12 " 4 " 5 " " " " "	130.00
"	E240, 12 " 2 " 6 " " { Special Quality }	105.00
"	E241, 12 " 3 " 6 " " { Genuine Bass }	130.00

For Handles attached to above Brooms, add $12.00 per Gross to lists

"Dustless" Floor Brushes.



Made of best quality Palma Fibre.

Light Finished Blocks and Handles.

		List Per Dozen
No.	590, 12 inch	$11.50
"	591, 14 "	13.25
"	592, 16 "	15.00
"	593, 18 "	16.75
"	594, 20 "	19.00
"	596, 24 "	24.00

Floor Brushes.

Black Walnut or Cherry Blocks, with light Hard-wood Covers, Varnished, Natural Finish. Two Threaded Staff Holes.

Wire Drawn. Polished Handles.

Mixed Hair Body, Black Hair Casing.

		List Per Dozen.
No.	530, 12 inch	$18.00
"	531, 14 "	21.00
"	532, 16 "	25.00
"	533, 18 "	30.00

Mixed Hair Body, White Hair Casing.

No.	540, 12 inch	$22.00
"	541, 14 "	26.00
"	542, 16 "	31.00
"	543, 18 "	37.00

Nos. 30, 31, 32, 33.

These **Push Brooms** are made from Selected Stock and are especially adapted

For Heavy Work.

No.	Trim.	Pcl
30	12 in.	
31	14 "	
32	16 "	
33	18 "	

Counter or Bench Dusters.

Red Polished Boston Handles.

Mixed Hair, White Cased, Wire Drawn.

		List Per Gross.
No. 400,	8 inch.	$50.00
" 401,	9 "	54.00
" 402,	10 "	58.00

Gray Tampico Fibre, Pitched.

No. 411,	8 inch.	$42.00
" 412,	9 "	48.00
" 413,	10 "	54.00

Pure Bristle, Gray Body, White Cased, Pitched.

Full Brushes, nicely finished.

No. 415,	8 inch.	$ 75.00
" 416,	9 "	112.00
" 417,	10 "	134.00

Handles.

Push Broom Handles.

		List Per Gross.
No. 120,	4½ ft. x 1⅛ in. diam. Hard-wood	$ 7.00
" 121,	5 " x 1⅛ " " "	12.00
" 122,	6 " x 1¼ " " "	16.00

These Handles are especially selected for use with our Push Brooms, the ends being chucked to fit staff holes. The variety is such as to afford a suitable handle for each of the various purposes for which Push Brooms are used. The No. 121, 4½ ft. are the handles generally sold by the jobbing trade. The No. 122, 6 ft. handles are made especially for municipal or corporation work, where the brooms have continual and hard service.

Upright Broom Handles.

For Brewers Brooms, etc.

		List Per Gross.
No. 241,	4 ft. x 1 in. diam. Hard-wood	$ 7.00

Window Brush Poles or Handles

Made from dry, selected stock, smoothly finished

		List Per Gross.
6 feet long,	⅞ in. diameter	$10.00
8 " "	⅞ " "	12.00
10 " "	⅞ " "	16.00

Wall Brush Poles or Handles.

Made from selected hard-wood nicely polished, for use with Floor or Window Brushes for brushing walls and ceilings in school houses, public buildings, etc.

	List Per Dozen.
10 feet long x 1¼ in. diam., shellac polish	$ 3.50

Lathe Brushes.

No. 20. Per doz.....$3 80

Counter or Bench Dusters.

No. 25. Per doz.....$14 00

Handled Cotton Mops.

12 oz	per doz.,	$4 00
14 "	"	4 50
16 "	"	5 00
18 "	"	5 50
20 "	"	6 00
22 "	"	6 50
24 "	"	7 00

Cotton Mops.

For car use,	5 lbs. per lb.,	$0 12
" " "	8 " "	12
" " "	12 " "	12

Mop Sticks.

With patent fastenings....per doz., $1 50

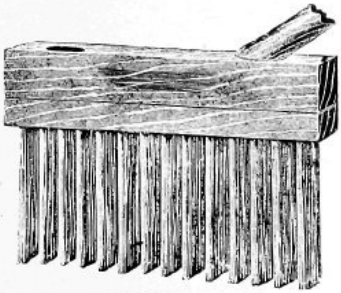
Chamois Skins.

No. 10.	Large. per kip,	$10 00
" 10.	" " doz.,	4 00

TURKEY FEATHER DUSTERS.

100 feathers. No.	B10	B12	B14	B16	B18
Price per dozen	$2 40	$3 00	$3 80	$4 50	$5 30
100 tail feathers. No.	112	114	116	118	
"Carriage" per doz.,	$3 85	$4 80	$6 25	$7 70	
120 tail feathers. No.	212	214	216	218	
"Car" per doz.,	$4 25	$5 30	$6 95	$8 50	

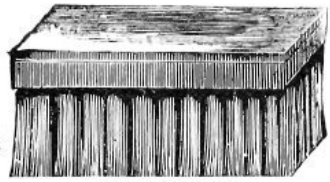
Steel Wire Car Track Curve and Switch Brooms.



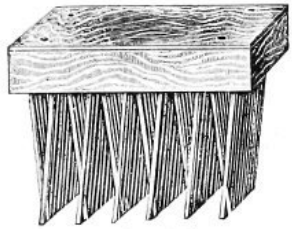
No. 168. List Per Gross.

No 168, 12 in., wire 5 in long $125.00

No. 160.

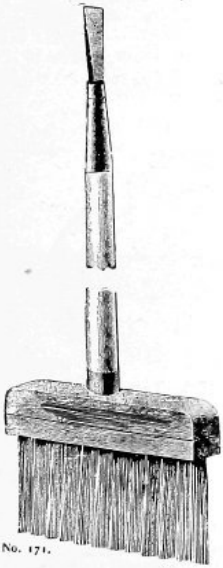


Nos. 161-162-165-166.



Nos. 163-164-167.

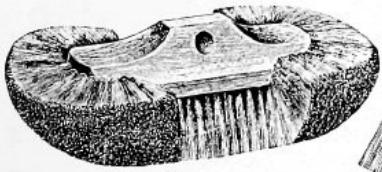
	Length Inches.	Length Width Inches.	of Wire Inches.	List Per Gross.
160, Heavy, Round End	6	5½	4½	$200.00
161, Medium, Square Ends	8	4	4	100.00
162, Extra Heavy, Square Ends	8¼	6¼	6	300.00
163, Medium, Acme Pattern	8	5¼	4	100.00
164, Heavy, Acme Pattern	8	4	4½	134.00
165, Heavy, Square Ends	8	4	4¾	125.00
166, Stiff, Medium Heavy, Square Ends	7	3½	3	96.00
167, Very Stiff, Extra Heavy, Acme Pattern	7	3½	3	150.00



No. 171.

	List Per Gross.
No 170, Length of Block 11 in., length of wire 4½ in., with plain handle	$110.00
171, Length of Block 11 in., length of wire 4½ in., with chisel handle	125.00

CAR WASHERS.



No. 7.

No. 7, extra quality Black Hair, $24.00

Car Washers.

Nos. 1, 2, 3.

Rubber Band Car Washers.

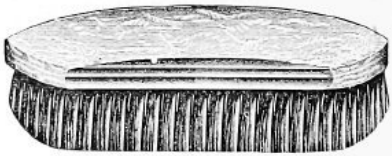
	List Per Dozen.
No. 1, large size	$44.00
" 2, medium size	36.00
" 3, small size	28.00

HORSE BRUSHES.

Wood Back.

PER DOZEN.

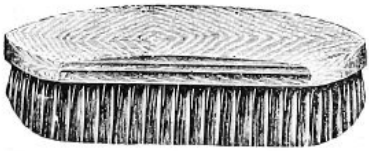
No. 60—Dandy, Sea Root, Long Stock, Oval Block, with Strap $4.00



PER DOZEN.

No. 52—Dandy, Calcutta Fiber, Long Stock, 10 in. Block, Hand Made $7.50

No. 53—Dandy, Rice Root, Long Stock, 10 in. Block, Hand Made 6.00



Wood Back.

PER DOZEN.

No. 40—Dandy, Sea Root, **Short Stock, 9 in. Block** $3.00

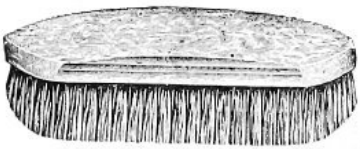
No. 50—Dandy, Sea Root, **Long Stock, Heavy, 11 in. Block** 5.00

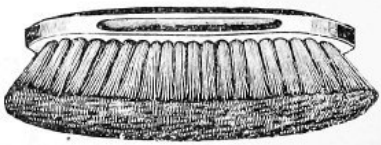
PER DOZEN.

No. 15—White and Black Tampico, Solid Back, 7 x 3 in $4.50

No. 16—Sea Root, 3 Row, Solid Back, 7x3 in. 3.50

No. 17—Palmetto, 5 Row, Solid Back, 7 x 2¾ in 6.00





PER DOZEN.

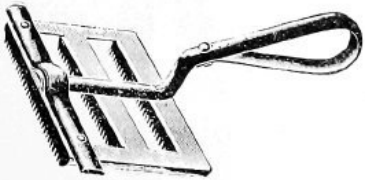
No. 18—Brown India Fiber, Solid Back, 10 x 2½ in $2.50

PER DOZEN.

No. 107—German Mixture, Solid Back, 8 x 2¾ in $6.00

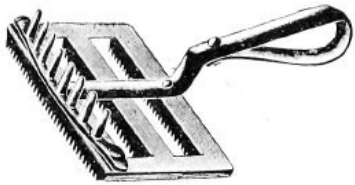
One-half Dozen in a Package

CURRY COMBS.



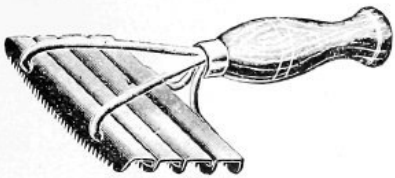
PER DOZEN.

No. 99—Lacquered, 6 Bar, Open Steel.....$1.00



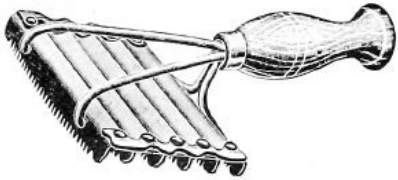
PER DOZEN.

No. 99 M—Lacquered, 6 Bar, Open Curry and Mane Comb Combined.....$1.50



PER DOZEN.

No. 1—Japanned, 5 Bars, Closed Iron Shanks through Handle and Riveted.....$0.70

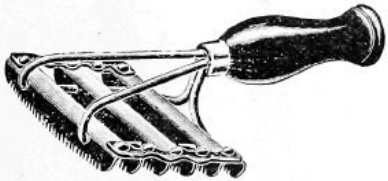


PER DOZEN.

No. 30—Japanned, 6 Bars, Closed Back, Carmine Handles, Shanks through Handle and Riveted....$1.24

No. 130—Tinned, 6 Bars, Closed Back, Black Enameled Handles, Shanks through Handle and Riveted, 1.34

No. 230—Brass, 6 Bars, Closed Back, Black Enamameled Handles, Shanks through Handle and Riveted..... 1.90

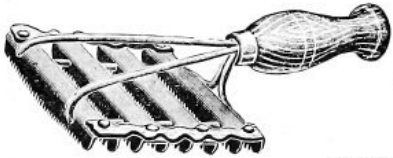


PER DOZEN.

No. 20—Japanned, 6 Bars, Open Back, Carmine Handles, Shanks through Handle and Riveted....$1.10

No. 120—Tinned, 6 Bars, Open Back, Black Enameled Handles, Shanks through Handle and Riveted, 1.20

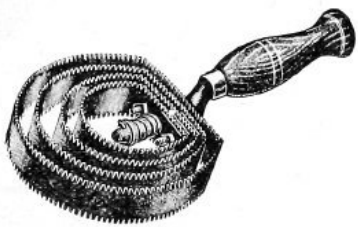
No. 220—Brass, 6 Bars, Open Back, Black Enameled Handles, Shanks through Handle and Riveted.... 1.60



PER DOZEN.

No. 21—Japanned, 8 Bars, Open Back, Carmine Handles, Shanks through Handle and Riveted....$1.30

No. 121—Tinned, 8 Bars, Open Back, Black Enameled Handles, Shanks through Handle and Riveted, 1.41

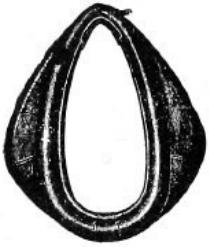


PER DOZEN.

No. 15—Japanned, 8 Bars, Circle, Clock Spring, Reversible Teeth Combs.....$1.00

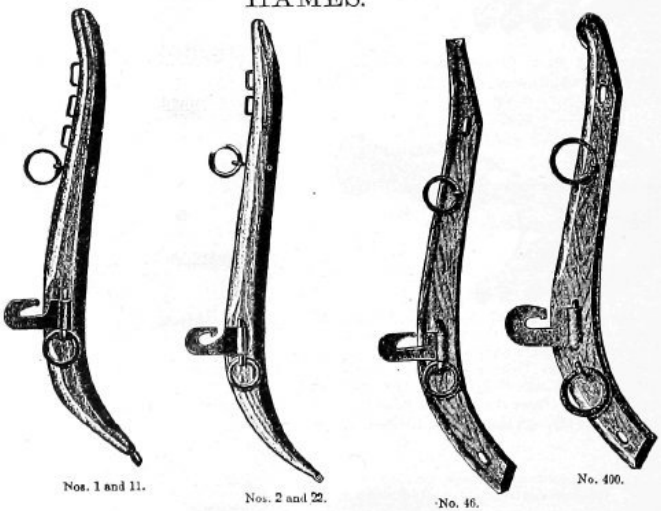
Packed One Dozen in a Box.

HORSE AND MULE COLLARS.



		PER DOZEN.
No. 15—Horse or Mule, **All Duck Collars**, with Leather Caps and Pad, Leather Hame Chafe, Full Rim,	{ Assorted 15 to 17, 16 to 18, 17 to 19 in., / Single Sizes, 17, 18, 19 in., }	5.00
No. 20—Horse or Mule, **Hog and Duck Collars**, Hog Skin Rim and Top, Duck Belly with Welt, Assorted 16 to 18, 17 to 19, 19 to 21 in.,		10.00
No. 8—Horse or Mule, **Harness Collars**, Black Heavy Tanned Kip with Heavy Hame Chafe and Welt, Extra Heavy, Assorted 16 to 18, 17 to 19, 19 to 21 in.,		20.00
No 200—Imitation Scotch, All Kip Leather, Metal Staple Sewed, Full Rim, Wool Stuffed Russet Face, Sole Leather Pressed Pads, with Hame Chafe and Plenty of Hame Room, Assorted 16 to 18, 17 to 19, 19 to 21 in.,		30.00

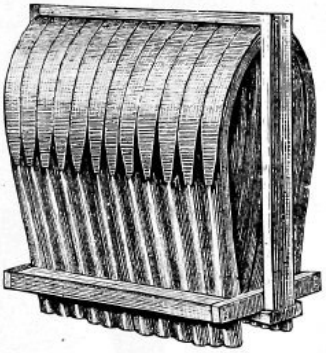
HAMES.



Nos. 1 and 11. Nos. 2 and 22. No. 46. No. 400.

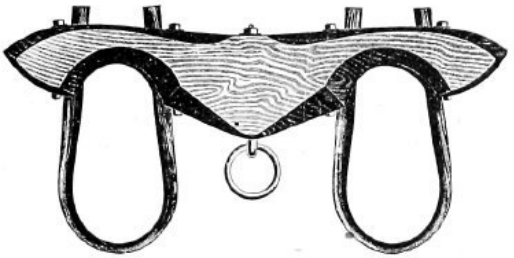
		PER DOZEN PAIRS.
No. 1	—**3 Loops, Hook Stage,** Iron over Top, **Varnished, Horse Sizes only,** (Fit 18, 19 and 20 in. Collars), Weight, per dozen, 40 lbs.,	$ 5.50
	One-half Dozen Pairs in a **Bundle.**	
No. 11	—**3 Loops, Hook Stage,** Iron over Top, **Painted Red, Horse Sizes only,** (Fit 18, 19 and 20 in. Collars), Weight, per dozen, 40 lbs.,	6.50
No. 2	—**2 Loops, Hook Stage,** Iron over Top, **Varnished, Horse or Mule Sizes,** (Fit 18 and 19 in. Horse or 17½ in. Mule Collars), Weight, per dozen, 40 lbs.,	5.00
	One-half Dozen Pairs in a **Bundle.**	
No. 22	—**2 Loops, Hook Stage,** Iron over Top, **Painted Red, Horse Sizes only,** (Fit 18 and 19 in. Collars), Weight, per dozen, 40 lbs.,	6.00
No. 46	—**Red Top, Root, Horse Sizes only,** (Fit 19 in. Collars), Weight, per dozen, 36 lbs.,	$3.50
No. 400—**Creole, Genuine Root,** Square Under Hook, Extra Heavy, **Horse Sizes only,** (Fit 18 and 19 in. Collars), Weight, per dozen, 60 lbs.,		10.00

OX BOWS AND OX YOKES.



OX BOWS.

Per single dozen, $10 50



OX YOKES.

Without Bows.

	Plain.	Ironed.
Each,	3 00	5 00

Wagon Single-Trees.

–32 in., Standard, Wagon, Hickory, Varnished, Ironed Complete, Weight, per dozen, 48 lbs. . . 5.50

–34 in., Standard, Wagon, Hickory, Varnished, Ironed Complete, Weight, per dozen, 58 lbs., . 6.75

PER DOZEN.

–36 in., Studebaker Pattern, Select Hickory, Varnished, ¼ in. **Malleable Wear Irons** or End Straps, ⅜ in. Wrought Hooks, 7/16 in. **Twist Center Clips,** Weight, per dozen, 72 lbs., ... $7.00

PER DOZEN.

–36 in., Contractors', Select Hickory, 2½ in. Diameter, **Painted Red and Varnished,** with Black Stripes, Ironed with ⅝ in. **Straight Center Clip,** ½ in. Ring, **Extra Heavy End Straps,** with 7/16 in. Turned Point **Wrought Hooks,** Weight, per dozen, 92 lbs., ... $15.00

–36 in., Ore, Extra Heavy, Select Hickory, 3 in. Diameter, **Painted Red and Varnished,** Ironed with ¾ in. **Wrought Center Clips,** ⅝ in. **Rings, Extra Heavy Wrought End Straps,** with ½ in. Turned Point **Wrought Hooks,** Weight, per dozen, 110 lbs., ... 18.00

Wagon Double-Trees.

PER DOZEN.

–48 in., 4 x 2 in., **Hickory,** Ironed Complete, Weight, per dozen, 150 lbs., ... $11.50

Neck Yokes.

PER DOZEN.

–40 in., Hickory, Varnished, Ironed Complete, Wrought Iron Center Attachments, Ring, 3½ in. Inside Diameter, Malleable End Ferrules, with Wrought Rings, Weight, per dozen, 85 lbs., . . . $ 8.00

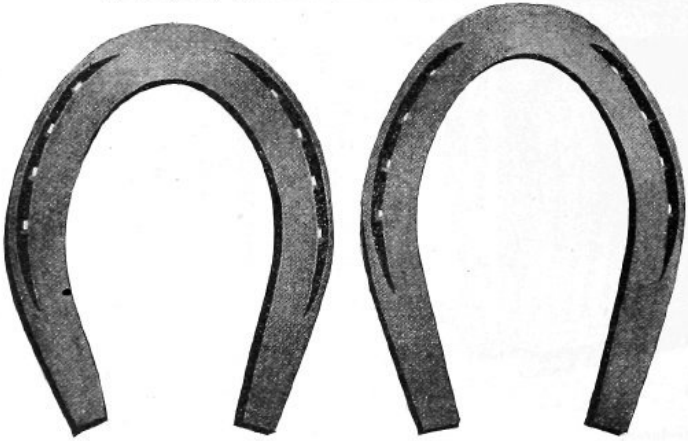
–42 in., Painted Red, (Same Trimmings as No. 140), Weight, per dozen, 96 lbs., ... 10.00

Extra Heavy, Contractors' and Scrapers'.

PER DOZEN.

–48 in., Hickory, Varnished, Ironed Complete, Wrought Iron Center Attachments, with **4 x ¾ in.** Wrought **Center Ring,** Malleable End Ferrules, with 3 x 7/16 in. Wrought End Rings, Weight, per dozen, 130 lbs., $18.00

HORSE, MULE AND OX SHOES.



Front. **HORSE SHOES.** Hind.

Light.

Front.

Size	0	1	2	3	4	5	6	7	8
Weight, ounces	11	14	17	20	25	29	36	41	48
Average number shoes in keg	145	114	94	80	64	55	44	39	33

Hind.

Size	0	1	2	3	4	5	6	7	8
Weight, ounces	9	11	14	18	22	27	31	35	40
Average number shoes in keg	178	145	114	89	73	59	52	46	40

Heavy.

Front.

Size	1	2	3	4	5	6	7	8
Weight, ounces	18½	22	26	30	36	43	48	58
Average number shoes in keg	86	73	62	53	44	37	33	28

Hind.

Size	1	2	3	4	5	6	7	8
Weight, ounces	15	18	22	26	30	35	40	46
Average number shoes in keg	107	89	73	62	53	46	40	35

Medium.

Front.

Size	1	2	3	4	5	6	7	8
Weight, ounces	17	20	25	29	35	40	46	55
Average number shoes in keg	94	80	64	55	46	40	35	29

Hind.

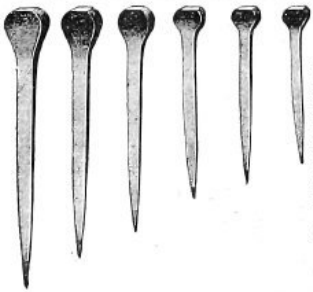
Size	1	2	3	4	5	6	7	8
Weight, ounces	14	16	20	24	29	34	38	43
Average number shoes in keg	114	100	80	67	55	47	42	37

MULE SHOES.

Size	00	0	1	2	3	4	5
Weight, ounces	8	9	12	14	16	23	27
Average number shoes in keg	200	178	133	114	100	70	59

OX SHOES.

Size	1	2	3	4	5	6
Length, inches	4½	5	5½	6	6½	7



HORSE SHOE NAILS.

No. 2.	Per lb	$2 00
No. 3.	"	1 00
No. 4.	"	50
No. 4½.	"	35
No. 5.	"	26
No. 6.	"	23
No. 7.	"	21
No. 8.	"	20
No. 9.	"	19
No. 10.	"	18

Horse Shoe Nails, Nos. 5 to 10, packed 5 lbs. in a carton, 5 cartons in a box.

Plate Nails, Nos. 2 to 4½, packed 1 lb. in a carton, 10 cartons in a box.

Heller Brothers' Horse Shoers' Tools

Horse Rasp

Regular (Half File)

Size, inches	10	11	12	13	14	15	16	17	18
Per dozen	$9.40,	11.40,	12.80	15.20,	17.80,	20.90,	24.40,	28.90,	32.90

16-inch is the usual size.

Pincers

12 inch.....Per dozen $18 00
13 " ..... " 19 20

Nippers

14 inch.....Per dozen $28 80
12 " ..... " 24 00

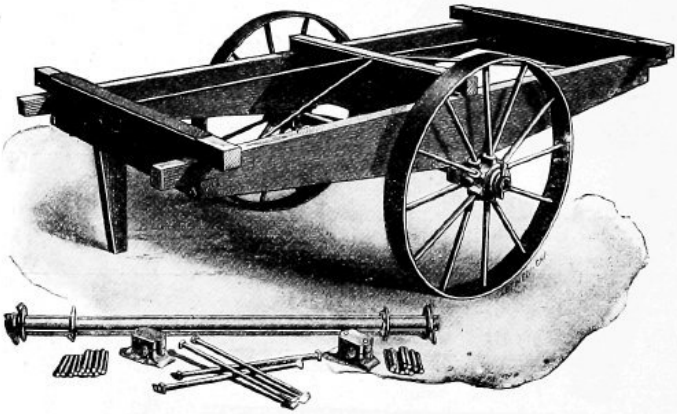
Hoof Knife

¼ to 1 inch.....Per dozen $5 50

Pritchel

12 inch.....Per dozen $3 50

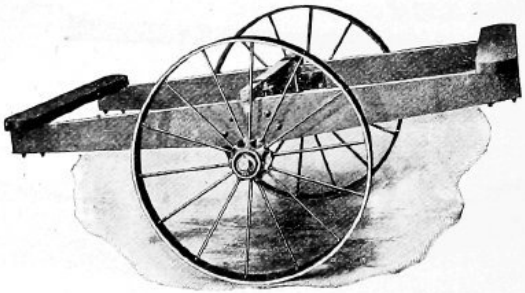
TRAMWAY TRUCKS OR LUMBER BUGGIES.



We furnish this truck complete as shown, or wheels, axle, bolts, bearing, boxes and roller bearings, as may be desired.

The wheels are 28 inches in diameter, tires 3x⅜ inch, the axle is 1¼ inch heavy pipe, and roller bearings are cold rolled shafting.

No. 250. Complete.....Price, $.....
No. 251. Wheels and iron parts only.....Price, $.....

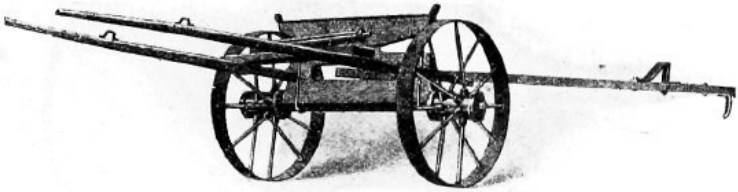


We furnish this truck complete, as shown with 36 inch wheels, 3x⅜ tires, heavy pipe axle to run on roller bearings; or the irons separate as may be desired; built out of the best hardwood.

No. 252. Complete.....Price, $.....
No. 253. Wheels and iron parts only.....Price, $.....

LUMBER CARTS

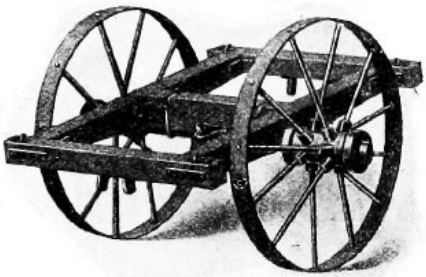
FOR SAW MILLS AND WOOD-WORK SHOPS



FRONT TRUCK

THIS CART

is used in Lumber Yards and for hauling Lumber into wood-work shops



REAR TRUCK

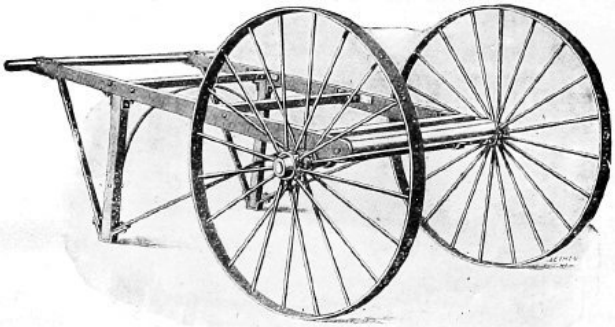
This cart is loaded and drawn alongside the planer; the lumber being handled directly from cart into planer. One horse with forward truck will keep ten or a dozen rear trucks employed For all around use in lumber yards, wagons are not so useful and cheap as these carts. The lumber is balanced on rear truck shown above, and the forward truck, with shafts, whiffle-tree and reach, are used mostly for guiding the rear truck, the coupling being done in a moment. When the two trucks are coupled together they make a perfect lumber wagon. The rear truck is heavily built, and is 5 feet long by 3 feet 6 inches wide.

COMPLETE TRUCK

This cut shows the two trucks coupled together, the same as an ordinary wagon. The reach has a hook at the end to hook into the draw staples of the rear truck. Forward truck has bolster with flat iron running its entire length and turned up at both ends, forming stakes, so the forward end of lumber loaded on rear truck will rest thereon when coupled. Shafts and all woodwork are made of the best quality of timber. We carry these trucks in stock.

Price, front truck, $30.00. Rear truck $30.00.

IMPROVED HAND TRUCKS.

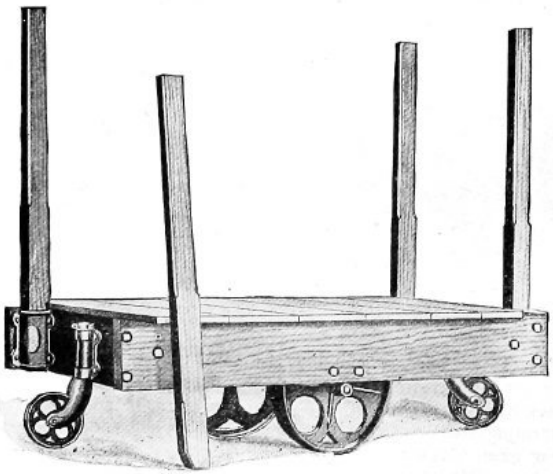


HEAVY WEIGHT.

Latest improved Hand Truck for Lumber Yards and Planing Mills, built for heavy loads and hard usage. Frame 7 feet long by 3 feet 6 inches wide, made from the best quality of maple. The front end is furnished with a 3 inch roller, having bearings running in solid iron boxes.

The axle is 1¾ cold rolled steel. Wheels are 44 inches in diameter with tires 3 inches by ½ inch.

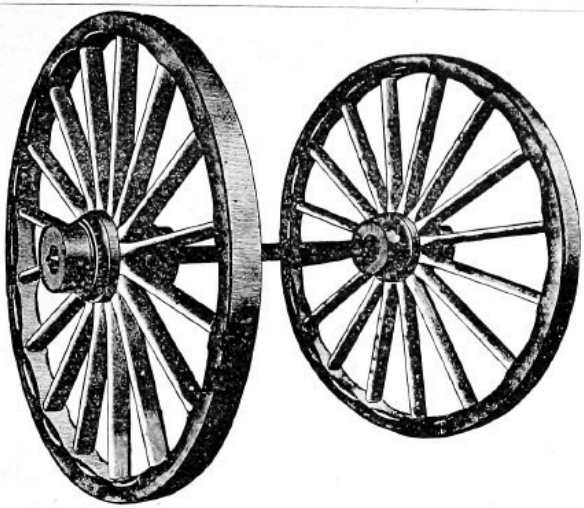
No. 254. Price..... $.....



FACTORY TRUCK.

The capacity of the truck is 2,000 lbs.; weight, 160 lbs.; size 28x48.

No. 151. Price.. $.....

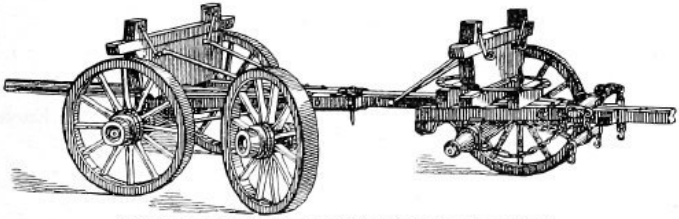


6 to 10 Feet in Diameter. 4 to 10 Inches width of Tire.

EVERY SPOKE used is THOROUGHLY SEASONED, while the Hubs and Felloes are gotten out of SELECTED STOCK especially for us. Axles are made of Solid Steel, and only BEST GRADE Iron used throughout.

ZELNICKER Log Wagons

SHOWING FIFTH WHEEL SUPPORT AND SWIVEL COUPLING POLE.



Wheels are all made 42 inches high unless otherwise ordered.

Size of Cast Skein.	Size of Tire	Shipping Weight.	Price of Cast Skeins.	Price of Malleable Long Sleeve Skeins.
3½ x 11	3 x ½	1000		
3½ x 11	4 x ½	1100		
3¾ x 11	3 x ½	1150		
3¾ x 11	4 x ½	1200		
4 x 12	3 x ½	1250		
4 x 12	4 x ½	1500		
4 x 12	5 x ½	1800		
4¼ x 12	4 x ½	1700		
4¼ x 12	5 x ½	1950		
4½ x 13	4 x ½	1800		
4½ x 13	5 x ½	2000		
5 x 14	5 x ½	2100		
5 x 14	6 x ½	2400		

These wagons will be made to suit purchasers, with any different width and thickness of tire than here specified, if wanted. The price varying accordingly. In ordering please state if wagon is to be for oxen or horses, also, if square or round coupling pole wanted. If for horses, whether to be drop or stiff tongue.

Bolsters are about 4 inch higher than wheels and have bunk blocks to keep logs in position.

Log Cart Material

Oak Hubs

PRICE PER PAIR.

18 x 20..... $.....
16 x 20.....
16 x 18.....
14 x 16.....
12 x 14.....

Ash Felloes

8 Pieces to the Wheel.
16 Pieces to the Set.

4 inch tread for 6 foot wheel.....Per Set $.....
5 " " 6 " " ..... " .....
4 " " 7 " " ..... " .....
5 " " 7 " " ..... " .....
6 " " 7 " " ..... " .....
7 " " 7 " " ..... " .....
5 " " 7½ " " ..... " .....
6 " " 7½ " " ..... " .....
7 " " 7½ " " ..... " .....
5 " " 8 " " ..... " .....
6 " " 8 " " ..... " .....
7 " " 8 " " ..... " .....

Oak Spokes

4 x 40 inch, for 6 to 7 foot wheels.....Each $.....
4½ x 42 " " 7½ " " ..... " .....
4½ x 45 " " 8 " " ..... " .....
4½ x 48 " " 9 " " ..... " .....

Oak Rims

5 inch x 7 foot ..... $.....
5 inch x 7½ foot.....
6 inch x 7 foot.....
6 inch x 7½ foot.....

Special Material Furnished to Order.

Logging Axles

Made of Solid Bar of Best Axle Steel, without Weld. With Linch Pins and Patent Malleable Washers.

STANDARD SIZES.

No. 1. Made of 3″ square steel. Boxes 15″ inches long. Length between collars, see accompanying cut 4′ 4″
Weight: safe approximate 275 pounds.

No. 2. Made of 3¼″ square steel. Boxes either 15″ or 16″ long. Length between collars, see accompanying cut, 4′ 4″
Weight: safe approximate 330 pounds.

No. 3. Made of 3½″ square steel. Boxes either 15″ or 16″ long. Length between collars, see accompanying cut, 4′ 4″
Weight: safe approximate 370 pounds.

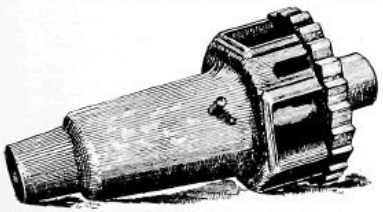
We can also furnish Axles made of 2¾″, 3¾″ or 4″ steel.

NOTE.—Use STANDARD SIZES in all cases where possible, because they can be shipped more promptly and extra boxes, &c., will always fit. Where STANDARD SIZES cannot be used, we can make these axles to suit, i. e. with either Nuts or Linch Pins and Washers, any length desired between collars, also boxes any length.

Price, 3″ to 4″ per pound.....cents.

" 2½″ to 2¾″ per pound.....cents.

" for arching extra per pound.....3 cents.



Log Cart Rollers

Cast Ratchet Rollers, either right or left hand, made from the most approved pattern.

Price, each.....$3 00

Cut shows a Left Hand Roller.

Skeins and Axles.

These Prices are for Skeins Only. No Boxes Furnished with Skeins.

We furnish skeins of any of the sizes given below at the prices quoted. If you order skeins for wheels you will always have a good fit.

D. V. Trade Cast Skeins.

No.	Size.		Per Set of Four.
1,	2 × 6	inches	$0.96
2,	2 × 6½	"	96
3,	2⅛ × 6½	"	96
4,	2¼ × 7	"	96
5,	2⅜ × 7	"	1.02
6,	2¼ × 7½	"	1.02
7,	2⅜ × 7½	"	1.02
8,	2½ × 7½	"	1.08
9,	2½ × 8	"	1.08
10,	2¾ × 8	"	1.14
11,	2¾ × 8½	"	1.20
12,	2¾ × 9	"	1.32
13,	3 × 9	"	1.32
14,	3 × 10	"	1.56
15,	3¼ × 9	"	1.62
16,	3¼ × 10	"	1.74
17,	3¼ × 11	"	1.86
18,	3½ × 10	"	1.86
19,	3½ × 11	"	2.10
20,	3½ × 12	"	2.22
21,	3¾ × 11	"	2.34
22,	3¾ × 12	"	2.46
23,	4 × 12	"	2.70
24,	4¼ × 12	"	3.90
24½	4½ × 12	"	5.10
25,	4¼ × 13	"	6.00
26½,	5 × 14	"	7.50

S. B. Trade Cast Skeins.

No.	Size.		Per Set of Four.
1,	2 × 6	inches	$1.08
2,	2 × 6½	"	1.08
3,	2⅛ × 6½	"	1.08
4,	2¼ × 7	"	1.08
5,	2⅜ × 7	"	1.14
6,	2¼ × 7½	"	1.14
7,	2⅜ × 7½	"	1.14
8,	2½ × 7½	"	1.20
9,	2½ × 8	"	1.20
10,	2¾ × 8	"	1.26
11,	2¾ × 8½	"	1.32
12,	2¾ × 9	"	1.44
13,	3 × 9	"	1.44
14,	3 × 10	"	1.68
15,	3¼ × 9	"	1.74
16,	3¼ × 10	"	1.86
17,	3¼ × 11	"	1.98
18,	3½ × 10	"	1.98
19,	3½ × 11	"	2.22
20,	3½ × 12	"	2.34
21,	3¾ × 11	"	2.46
22,	3¾ × 12	"	2.58
23,	4 × 12	"	2.82
24,	4½ × 12	"	4.62
24½,	5½ × 12	"	5.22
25,	4½ × 13	"	6.12
26,	5 × 14	"	7.62

Patent Steel Skeins.

No.	Size.		Per Set of Four.
1,	2¼ × 7	inches, with Nuts	$4.00
1½,	2½ × 7½	" " "	4.41
2,	2½ × 8	" " "	4.52
3,	2¾ × 8	" " "	4.80
4,	2¾ × 8½	" " "	4.91
5,	2¾ × 9	" " "	5.09
6,	3 × 9	" " "	5.19
7,	3 × 10	" " "	5.28
8,	3¼ × 9	" " "	5.78
9,	3¼ × 10	" " "	5.81
10,	3½ × 10	" " "	6.46
11,	3½ × 11	" " "	6.63
12,	3½ × 12	" " "	7.00
13,	3¾ × 11	" " "	7.81
14,	3¾ × 12	" " "	7.81
15,	4 × 12	" " "	9.38
16,	4½ × 12	" " "	10.13
17,	4½ × 13	" " "	14.00
18,	5 × 14	" " "	17.75
19,	2½ × 8	" with Linch Pin	4.53
19½,	2¾ × 9	" " "	5.09
20,	3 × 10	" " "	5.28
21,	3¼ × 10	" " "	5.81
22,	3½ × 10	" " "	6.46
23,	3½ × 11	" " "	6.63
24,	3½ × 12	" " "	7.00
25,	3¾ × 12	" " "	7.81
26,	4 × 12	" " "	9.37
27,	4¼ × 12	" " "	10.13
28,	4½ × 13	" " "	14.00

Best Hickory Axles, Fitted with Cast-Iron and Steel Skeins.

These Prices Are for One, and Not a Set.

	Cast Skeins	Weight, Pounds	With Cast Skeins and Boxes	Weight, Pounds	Steel Skeins	Weight, Pounds	With Steel Skeins and Boxes	Weight, Pounds
Hickory Axles, fitted with 3 × 9 or any smaller size	$2.80	40	$3.55	50	$4.80	30	$5.30	40
Hickory Axles fitted with 3¼ × 9 or 3¼ × 10	3.40	50	4.10	62	5.40	40	6.15	50
Hickory Axles, fitted with 3½ × 10 or 3½ × 11	4.00	60	4.70	74	6.00	48	6.75	60
Hickory Axles, fitted with 3¾ × 11 or 4 × 12	5.40	70	6.20	90	9.50	55	10.70	80
Hickory Axles, fitted with 4½ × 12 or 4½ × 13	6.60	100	7.25	135	11.25	80	12.50	105
Hickory Axles, fitted with 5 × 14	9.30	125	11.30	165	14.50	100	16.00	130

Electric Solid Steel Axles.

We furnish these axles arched or bent, as desired, at extra prices.

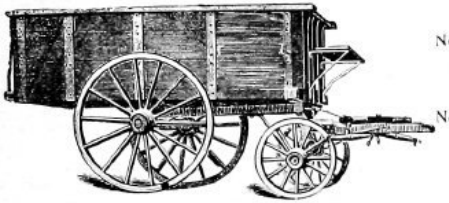
Size, Inches	Length of Boxes, Inches	Weight per Set, Pounds	Price per Set	Carrying Capacity per Set, Pounds	Size, Inches	Length of Boxes, Inches	Weight per Set, Pounds	Price per Set	Carrying Capacity per Set, Pounds
1⅛	6½ and 7	60	$5.00	500	2¼	10, 11 and 12	285	$16.00	6,500
1¼	7 and 7½	75	6.00	800	2½	11 and 12	355	20.00	9,000
1⅜	7½ and 8	88	6.50	1,200	2¾	12	430	28.00	12,000
1½	7½, 8 and 8½	110	7.00	1,700	3	13	488	34.00	15,000
1⅝	8½ and 9	128	8.00	2,000	3½	15	728	48.00	22,000
1¾	9 and 10	155	9.00	2,000	4	15	920	60.00	35,000
2	10 and 11	220	12.00	5,000					

Standard Width of Track from Center to Center of Tire on the Ground.

Narrow track ..... 4 feet, 6 inches. Wide track ......5 feet. California track......5 feet 2 inches.

Order by Trade No. in all cases, to avoid misunderstanding. When ordering, be careful to give width of track wanted. Longer or shorter boxes to order.

SAWMILL DUMP CART.

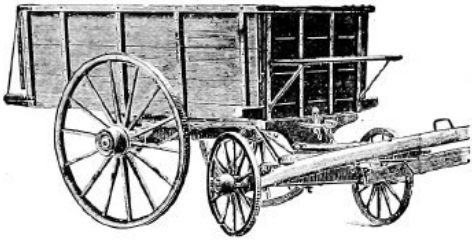


No. 54 Standard Size. Two Horse 4 Wheel Dump Cart. Built in two sizes.

Capacity ¾ Cord when dumped in loose.

No. 54 Extra Large Size. Capacity 1 full Cord when dumped in loose.

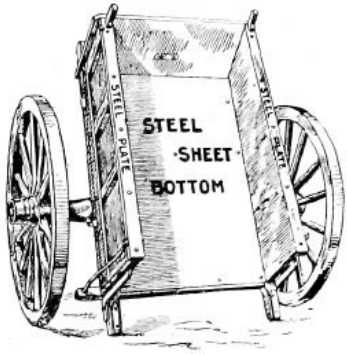
Write for prices State capacity.



No. 55. One Horse 4 Wheel Dump Cart. Capacity ½ cord when dumped in loose

Write for prices. State capacity

CONTRACTORS' AND QUARRYMEN'S ROCK CART.

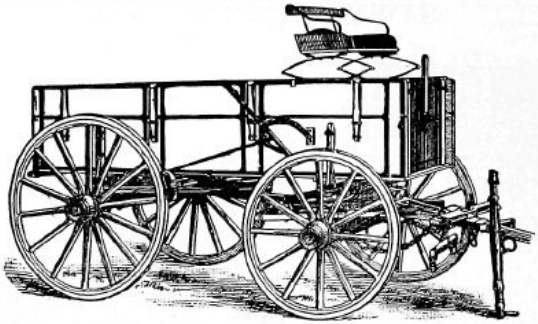


These Carts are furnished in the following sizes.

Size of Skein	Size of Tire.	Price.
3¼ x 10 inch. Malleable Long Sleeve Skein	2½ x ½	$40 00
3½ x 11 " " " " "	2½ x ½	42 00
3¼ x 11 " " " " "	2½ x ½	45 00

These Carts are heavy Ironed, the bottom of same are lined with Sheet Steel, also the top of sides, as shown in cut. These Carts will be furnished with any different width and thickness of Tire than above specified, but the price varying accordingly.

REGULAR PLAIN THIMBLE SKEIN WAGONS.



Size of Skein.	Size of Tire	Weight.	Carries.	Price.
2¼x 8	1¼x¼	700 lbs.	1200 lbs.	$48 00
2¼x 8½	1¼x¼	800 "	1800 "	49 00
3 x 9	1¼x¼	900 "	2500 "	50 00
3¼x10	1¼x⅜	1000 "	3000 "	52 00
3¼x11	1¼x⅜	1100 "	3500 "	56 00
3¼x11	1¼x⅜	1200 "	3900 "	62 00
4 x12	2 x⅜	1400 "	4600 "	70 00

EXTRAS, NOT INCLUDED IN ABOVE.

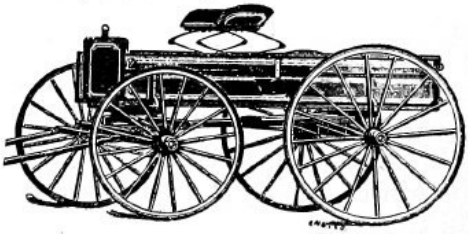
Spring Seats, No Back	each, $2 25	Brakes	each, $2 50
Spring Seats, Lazy Back	" 2 50	Wagon Sheets, 10x13, 10 oz.	" 3 50
Wagon Bows	per set, 75	Gear Brakes (See Page 13)	each, 4 50
Feed Boxes	each, 75		

These Wagons are made of the best seasoned Hickory and White Oak, and ironed with the best of iron, and are painted handsomely, run easy, and are first-class in every respect, are well adapted for the Western and Southern trade, and are warranted for one year.

If Tires are wanted wider than above stated, add $5.00 per inch for four wheels.

All wagons without beds, deduct $10.00.

Stiff Tongue (Instead of Drop), additional, $1.00.



ONE-HORSE WAGON.

WITH REGULAR SHAFTS.

ONE-HORSE WAGONS.

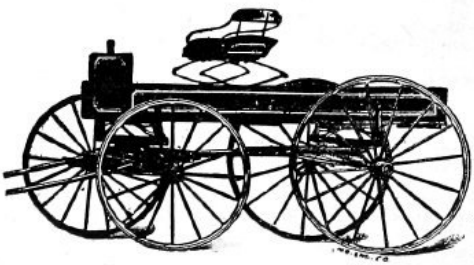
WITH PATENT WHEELS, SOLID STEEL AXLES, LIGHT, STRONG, DURABLE AND NICELY FINISHED.

Suitable for Gardeners, Creameries, Carpenters, Etc.

Size.	Size of Tire	Height of Wheels. Front.	Hind.
1¼ x 7	1¼ x ⅜	3 ft. 6 in.	4 ft. 2 in.
1⅜ x 7½	1¼ x ⅜	3 ft. 6 in.	4 ft. 2 in.

Width of Beds Between Standards.	Length of Beds.	Depth of Beds.
3 ft. 2 in.	8 ft. 6 in.	10 in.
3 ft. 2 in.	8 ft. 6 in.	10 in.

Capacity	Weight.	Price, with Shafts. Including One Spring Seat.
1000 lbs.	450 lbs.	$40 00
1300 "	500 "	41 00



ONE-HORSE HALF-SPRING WAGON.

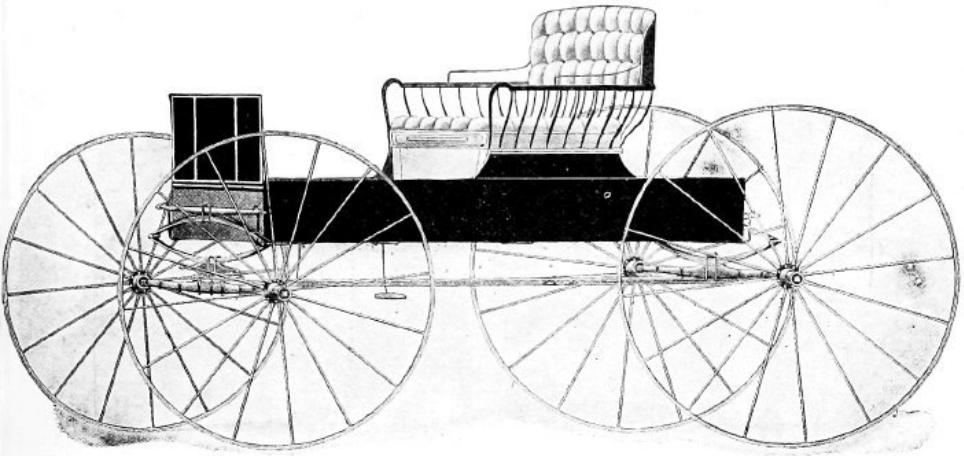
WITH REGULAR SHAFTS.

These wagons are made light and serviceable for a run-about wagon.

Extras not included in above.

The Pole with Doubletrees, Singletrees and Neckyokes, etc. $5 00

Bolster Springs (See Page 15) 9 00



STICK-SEAT DRIVING WAGON No. 711.

This Driving Wagon is a very handsome vehicle, and has always proven a decided favorite with our trade. It is something that is stylish, serviceable and up-to-date, and something that will meet the requirements of every one wanting a first-class Driving Wagon.

Wheels.—Made with either ¾, ⅞ or 1 inch wheels of selected hickory; with best steel tire bolted between each spoke.

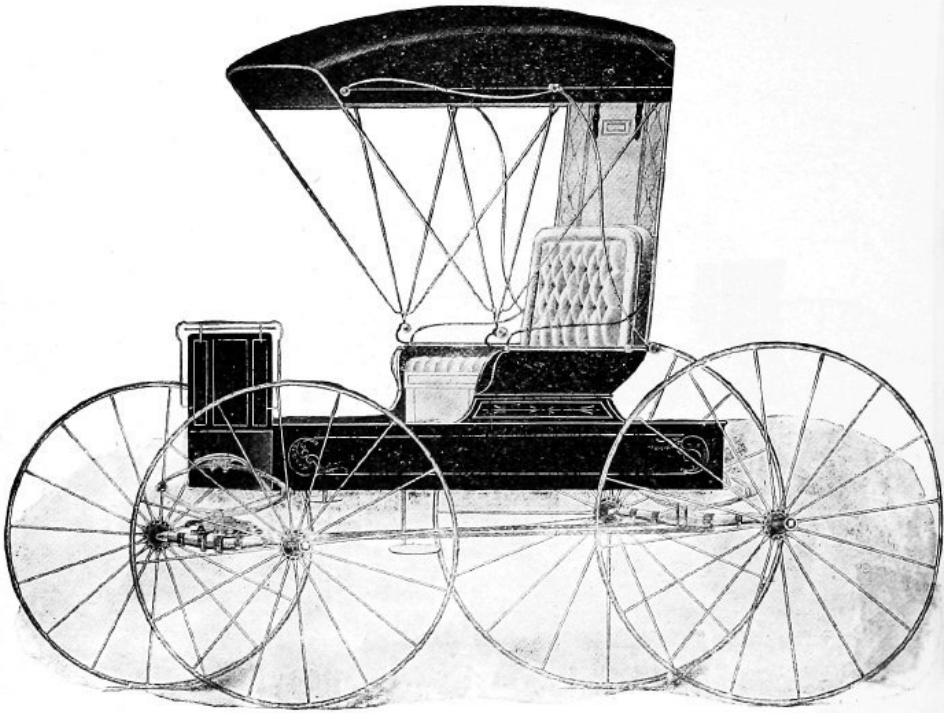
Body.—We furnish bodies 20, 22 or 24 inches in width and 55 inches in length. In case you do not specify which size body, we always ship the widest.

Painting.—Bodies are painted a deep, rich black, and running gear either dark Brewster green or red.

It is fitted with full-length body loops, open bottom spring cushion and a nicely padded back, made of either high-grade leather or whipcord, as ordered. In case you do not specify which trimming is wanted, we always ship whipcord.

List price.....each, $60 00

Write for catalogue showing full line of vehicles.



"ZELNICKER" FANCY BUGGY.

No. 603 Top Buggy will suit you if you want a buggy that will wear and is up-to-date. This buggy is built with steel Bailey body loops, clipped on to fine oil tempered elliptic springs; long-distance, sand-proof axles, drop (arched, if ordered).

Top.—*Leather quarter top*, four bow, with leather stays, fancy stitched with all-wool head lining, rubber roof and cloth lined rubber back curtain with rubber drill side curtains; upholstering is soft, deep buff leather in back and cushion; it has spring cushion and solid panel spring back, and we can furnish in green, red or tan leather, green cloth or whipcord.

Wheels.—Are furnished ¾, ⅞ or 1 inch, Sarven patent; best hickory throughout.

Body.—Piano style, 16, 20, 22 or 24 inches wide and 55 inches long; leather dash with fine nickel rail, seat handles and prop nuts.

Painting.—Body jet black and fancy ornamented, as shown in cut (or plain black, if ordered); the gear a dark green, bright red or carmine, nicely striped.

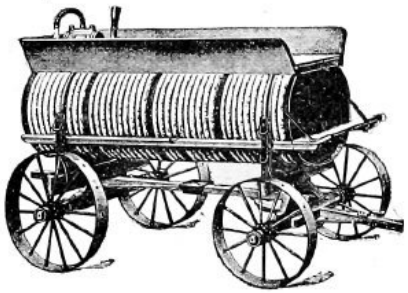
All complete with carpet, side and toe panels, storm apron, boot, wrench, etc.

With shafts on this buggy. List price.....each, $70 00

No. 604 Top Buggy is the same as No. 603, above described, only it has a *full leather top*, with rubber drill side curtains; complete with shafts.

With shafts on this buggy. List price.....each, $75 00

Write for catalogue of full line of vehicles.



GALVANIZED TANK WAGON.

		Price.
Tank and Wagon complete, without pump,	12 bbl., weight 1,050 lbs.	$90 00
" " " " " "	9 " " 1,000 "	80 00
" " " " with "	12 " " 1,100 "	95 50
" " " " " "	9 " " 1,050 "	85 50
Tank complete, without wagon or pump,	12 " " 450 "	53 00
" " " " " "	9 " " 400 "	43 00

Size of 12 barrel tank 2 feet 7 inches by 9 feet 6 inches.
" " 9 " " 2 " 7 " " 7 " 0 "

These Tanks are made of the best galvanized steel 16 and 20 gauges, well riveted with double row of rivets, also well soldered, and banded with extra heavy bands.

Wagon and Tank take 3rd class freight rate to any point in the United States.

STABLE, DERRICK AND FOUNDRY PAILS.

Stable, Derrick and Foundry Pails are made of the best quartered white oak, and have a patent strap-ear, making them strong and durable for the purposes for which they are intended.

Standard size, diameter 13 inches, height 11¾ inches, weight 100 lbs. per dozen; made also in larger size for sewerage purposes.

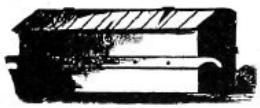
Price, with black hoops.....per doz., $5 50

WATER BARRELS.

For use in cars, shops and on track.

50 gallon,	with cover		each,	$3 00
30	"	"	"	2 50
20	"	"	"	2 25
15	"	"	"	2 00
10	"	"	"	1 50
5	"	"	"	1 25

TOOL CHESTS.



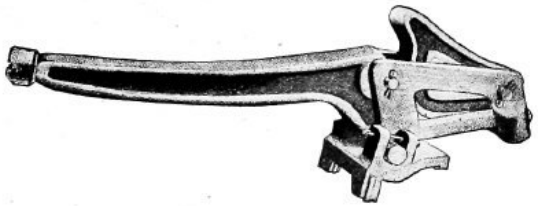
Chest 6 feet long, 2 feet 2 inches broad, and 2 feet 4 inches high, of good heavy, seasoned pine lumber, with hardwood handles on either side, cover of two thicknesses of matched plank running different ways, with a strip of canvas between, making it water-tight; all has one coat of good metallic paint, and chest has hasp, staple, lock, etc., complete.

We send with the chest the following list of tools for gang of—say 6 men:

1 Red Flag.	2 Tamping Bars.	1 Track Level.
1 Green Flag.	2 Lining Bars.	1 Rail Fork.
1 White Lantern.	2 Spike Mauls.	1 Pair Track Tongs.
1 Red Lantern.	6 Shovels.	3 Chisels.
1 Adze.	2 Picks.	1 Oil Can.
1 Axe.	1 Track Gauge.	1 Water Pail.
1 Claw Bar.	1 Track Wrench.	1 Drinking Cup.

We make any size chest with tools for gang of any number of me...

DOUBLE CLUTCH CAR MOVER.



SIMPLE DURABLE EFFICIENT

The Double Clutch Car Mover has two features that are entirely new and most practical.

FIRST—The concave block coming in contact with the outer rim of the wheel, TURNS IT, but DOES NOT LIFT IT.

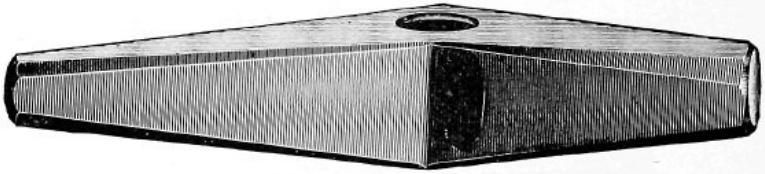
SECOND—The Double Clutch has V-shaped bits which catch the edges of the rail, where it is soft. The harder you bear down on the lever the tighter they stick to the rail.

It is made of malleable iron and best tempered steel, and weighs ONLY 18 lbs.

Price each, $5.00

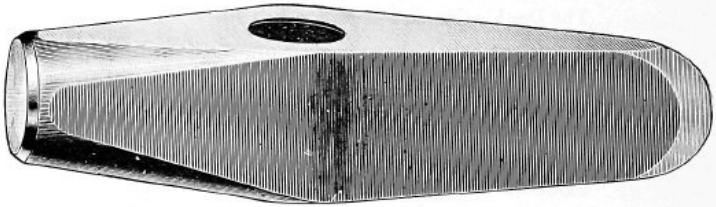
OUR SELLING AGENTS ARE ALL OVER THE WORLD.

RAILROAD TRACK MAUL.



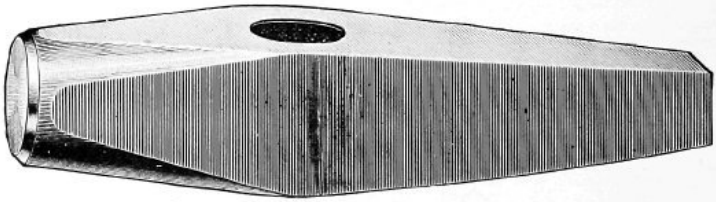
Oil finished polished faces, weight 6 to 12 lbs.....list price per lb., $0 30
Full polished, weight 6 to 12 lbs..... " " 40
" " and handled 6 to 12 lbs..... " " 50

RAILROAD TRACK CHISEL.



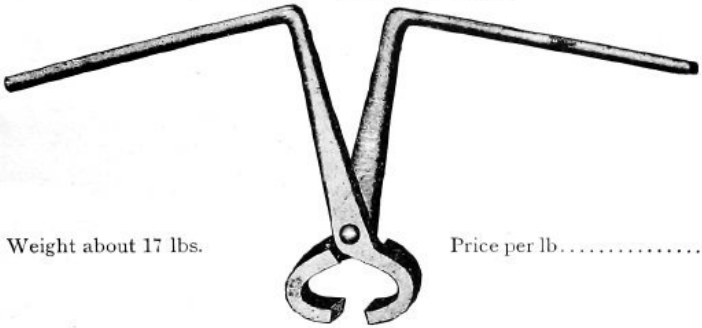
Extra tool steel, weight 3 to 5 lbs.....list price per lb., $0 50

RAILROAD TRACK PUNCH.



Extra tool steel, weight 3 to 5 lbs.....list price per lb., $0 50

RAILROAD TRACK TONGS.



Weight about 17 lbs. Price per lb.....$0 30

RAIL FORKS.

Weight about 7½ lbs.....price per lb., $0 25

RAILROAD TRACK WRENCHES.

Zelnicker, drop forged, 30 inch handle.....price per lb., $0 25

DOUBLE END TRACK WRENCHES.

Weight of 24 inch, 6 lbs.....price per lb., $0 45

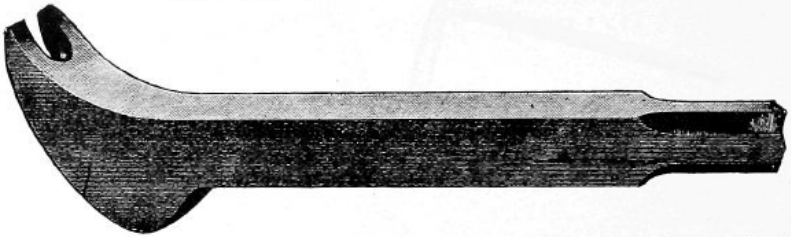
SHACKLE BARS.

Size, 1½ inch in the square, length 5 feet.....price each, $6 00

TAMPING BARS.

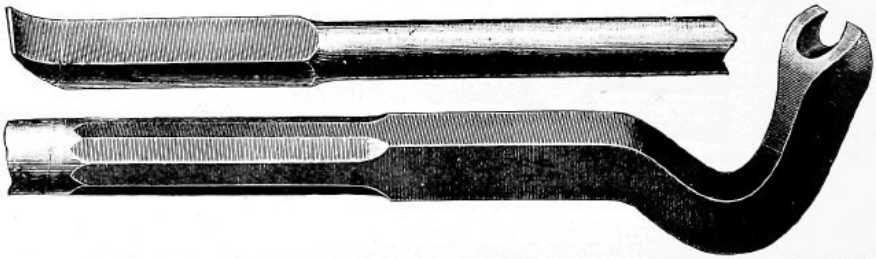
Weight about 14 lbs.....price per lb., $0 16

RAILROAD CLAW BARS (with Heel).



Weight about 28 lbs.....price per lb., $0 22

GOOSE NECK CLAW BARS.

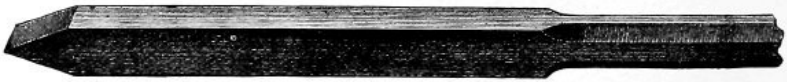


Weight about 25 lbs.....price per lb., $0 22

CROW BARS (Pinch Point).

Weight 10 to 40 lbs.....price per lb., $0 12

CROW BARS (Wedge Point).



Weight 10 to 40 lbs.....price per lb., $0 12

LINING BARS.

Weight 18 to 25 lbs.....price per lb., $0 12

TRACK GAUGES AND LEVELS.

Huntington Track Gauge.

These gauges are made of a piece of iron pipe with malleable iron ends securely screwed and pinned on. The peculiar form of the left hand end brings the cross bar exactly at a right angle to the rail, and insures an accuracy of gauge on either curves or straight rails. When ordering state gauge of road. Price each, $3.50.

McManus' Combined Track Gauge and Level, with Squaring Attachment.

The Glass Level on top is securely set in elastic packing under the handle to prevent breakage. The Ratchet on end is for elevations, and is accurate and convenient. The Stick is made of ash with iron trimmings.
Standard gauge, 4 feet 8½ inches. Price $4.00 each.
Made for tracks of any desired gauge.

Wood Track Levels.

No. 90. Railroad Track Level. Price $3.50 each.

Wood bar, iron shod, with spirit glass set on top and protected by handle. One end is cut in steps to be used to obtain any desired elevation.

No. 100. Railroad Track Level Price $3.25.

Same as No. 90, but with leveling glass set on the side instead of on the top and can be seen at 10 or 15 feet distant from either side. Metal discs protect the glass when not in use, as shown in the cut.

No. 110. Street Road Track Level. Price $3.00 each.

Same as No. 100, without the steps. Is 61 inches long, but can be made for any gauge of track. The metal band on the bottom can be removed if desired, for electric roads.

SOLID CAST STEEL
MAULS, SLEDGES, HAMMERS, STEEL WEDGES, ETC.

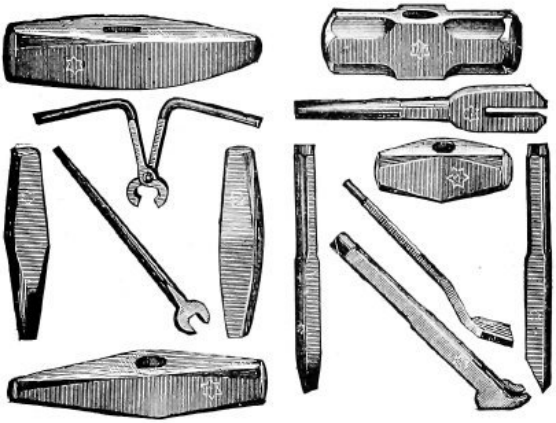
No.		5 lbs. and over.	3 to 5 lbs.	Under 5 lbs.
34.	Smith's Sledges,	$0 30	$0 40	$0 50
35.	Stone "	30	40	50
36.	Coal "	30	40	50
37.	Striking "	30	40	50

No.		5 lbs. and over.	3 to 5 lbs.	Under 5 lbs.
43.	Hand Drilling Hammers	$0 40	$0 50	$0 55
45.	Napping Hammers,	30	40	50
39.	Mason "	50	55	60
42.	Smiths' Hand "	30	40	50
44.	Drilling or Striking Hammers	30	40	50
40.	Single Face Spall'g Hammers	40	50	55
41.	D'ble Face Spall'g Hammers	40	50	55

No.		Per lb.
51.	Steel Wedges, Coal	$0 20
52.	" " Stone	20
68.	" " Wood	20
50.	" " " Truckee, 1st Quality	25
50.	Steel Wedges, Wood Truckee, 2nd Quality	20
49.	Ship or Top Maul, all sizes	42
46.	Wood Choppers' Maul, straight cut	36
38.	Stone and Granite Axe, all sizes,	50
67.	Octagon Pattern, Turning Sledge,	40

Steel faced, instead of solid cast steel Hammers and Sledges, made in any desired pattern to order.

VERONA TOOLS.



No. 1.	Track Chisel	per lb.,	$ 0 25
No. 2.	Tamping Pick, "V" Tamper	per doz.,	12 00
No. 3.	" " "T" "	"	12 00
No. 4.	Claw Bar	per lb.,	12
No. 5.	Spike Maul, new pattern	"	16
No. 6.	" " old "	"	16
No. 7.	R. R. Clay Picks	per doz.,	10 00
No. 8.	Napping Hammers, 4 lbs. and over	per lb.,	16
No. 9.	" " under 4 lbs	"	20
No. 14.	Hand Drilling Hammers, 4 lbs. and over	"	16
No. 14.	" " under 4 lbs	"	20
No. 15.	Double Face Striking Sledge, 6 to 40 lbs	"	16
No. 16.	" " " " Hammers, 4 lbs. and over	"	16
No. 16.	" " " " under 4 lbs	"	20
No. 17.	Clay Picks, Diamond Point	per doz.	10 00
No. 19.	Miner's Picks, Curved, any weight	per lb.,	20
No. 20.	" Pick Surface, "	"	20
No. 21.	Coal Pick, any weight	"	25
No. 22.	Mining Pick	"	20
No. 23.	Stone "	"	20
No. 28.	Smith's Sledge, 6 to 26 lbs	"	16
No. 29.	Track Punch, Best Tool Steel	"	25
No. 30.	Stone Wedge, any weight	"	10
No. 31.	Pinch Bar, any weight	"	10
No. 32.	Lining Bar, "	"	10
No. 33.	Tamping Bar, any weight	"	12
No. 34.	Rail Tongs, " "	"	20
No. 35.	" Forks, "	"	20
No. 36.	Track Punch, Round Point	"	25
No. 37.	Flatters, Square	"	30
No. 38.	Fullers, Top and Bottom	"	30
No. 39.	Swages, " "	"	30
No. 40.	Cold Cutting Chisel	"	25
No. 41.	Hot " "	"	25
No. 43.	Stone Axe	"	19
No. 44.	Ore Sledge	"	19
No. 45.	" Striking Hammer	"	19
No. 51.	Single End Track Wrench	"	14
No. 51.	Double End "S" Shape Track Wrench	"	22
No. 52.	Striking Hammers, 4 lbs. and over	"	16
No. 52.	" " under 4 lbs	"	20
No. 56.	Spike Puller	"	50
No. 58.	Ship Maul	"	20

LOCOMOTIVE JACK SCREWS.

All screws warranted to carry weights listed.

Diam. of Screw, inches.	Height of Stand, inches.	Price Each.	Diam. of Screw, inches.	Height of Stand inches	Price Each
1¼	4	$ 2.90	2	24	$13.50
1¼	6	3.10	2¼	6	7.00
1¼	8	3.40	2¼	8	7.50
1¼	10	3.80	2¼	10	8.25
1¼	12	4.20	2¼	12	9.00
1¼	14	4.60	2¼	14	10.00
1½	4	3.25	2¼	16	11.00
1½	5	3.50	2¼	18	12.00
1½	6	3.75	2¼	20	13.25
1½	8	4.25	2¼	22	14.50
1½	10	4.75	2¼	24	15.75
1½	12	5.25	2½	6	7.75
1½	14	6.00	2½	6½	8.00
1½	16	6.75	2½	8	8.75
1¾	6	4.50	2½	10	9.75
1¾	8	5.00	2½	12	10.75
1¾	10	5.75	2½	14	12.00
1¾	12	6.25	2½	16	13.25
1¾	14	6.75	2½	18	14.50
1¾	16	7.50	2½	20	15.75
1¾	18	8.50	2½	22	17.00
2	5	5.00	2½	24	18.25
2	6	5.25	2½	28	22.00
2	8	6.00	2½	32	26.00
2	10	6.75	3	14	19.50
2	12	7.50	3	16	20.75
2	14	8.25	3	18	22.00
2	16	9.25	3	20	23.25
2	18	10.25	3	22	24.50
2	20	11.50	3	24	25.75
2	22	12.50	3	30	30.00

	Capacity, tons	For height over all add to height of stand, inches.
1¼ inch screws	10	2¼
1½ " "	12	2½
1¾ " "	16	2¾
2 " "	20	3¼
2¼ " "	24	3½
2½ " "	28	4
3 " "	36	4½

Levers sent only when ordered, and are charged extra.

HOUSE RAISING JACKS.

Cast Iron.

These screws are cast with seamles, threads, which make them very smooth and uniform.

Diam. of Screw, inches.	Height Over All, inches.	Price Each.	Diam. of Screw, inches.	Height Over All, inches.	Price Each.
3	20	$3.50	3	30	$4.75
3	22	3.75	3	32	5.00
3	24	4.00	3	34	5.25
3	26	4.25	3	36	5.50
3	28	4.50			

Regular size is 3x24 inches.

BELL BASE RATCHET JACK SCREWS.

Has wrought iron screw, cast iron stand and cap, and steel ratchet, pawl, and handle.

Diam. of Screw, inches.	Height Over All, inches.	Price Each.	Diam. of Screw, inches	Height Over All, inches.	Price Each.
2	12	$16.00	2½	22	$24.50
2	14	16.75	2½	24	25.50
2	16	17.50	2½	26	26.50
2	18	18.25	2½	28	27.75
2	20	19.00	2½	30	29.00
2	22	19.75	2½	34	33.00
2	24	20.50	2½	36	35.00
2	26	21.50	2½	38	37.00
2	28	22.50	2¾	20	27.50
2	30	23.50	2¾	24	30.00
2¼	18	21.00	2¾	28	32.50
2¼	20	22.00	2¾	30	34.00
2¼	22	23.00	2¾	36	40.00
2¼	24	24.00	3	20	32.00
2¼	26	25.00	3	24	35.00
2¼	28	26.00	3	26	37.00
2¼	30	27.00	3	28	38.50
2½	18	22.50	3	30	40.00
2½	20	23.50	3	36	48.00

Capacity.

2 inch screws......24 tons | 2¾ inch screws......36 tons
2¼ " " ......28 " | 3 " " ......40 "
2½ " " ......32 "

TRIPOD RATCHET JACK SCREWS.

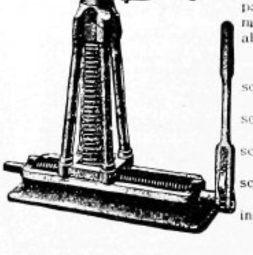
Have wrought iron screws, legs and bases, brass nuts and steel ratchets, pawls, and handles.

Diam. of Screw, inches.	Height Over All, inches.	Price Each.	Diam. of Screw, inches	Height Over All, inches	Price Each.
2¼	18	$50.00	2½	36	$67.00
2¼	20	51.00	2¾	24	65.00
2¼	22	52.00	2¾	26	66.25
2¼	24	53.00	2¾	28	67.50
2½	18	56.50	2¾	30	68.75
2½	20	57.50	2¾	36	73.00
2½	22	58.50	3	24	70.00
2½	24	59.50	3	26	71.50
2½	26	60.75	3	28	73.00
2½	28	62.00	3	30	74.50
2½	30	63.25	3	36	79.00

Capacity.

2¼ inch screws......28 tons | 2¾ inch screws......36 tons
2½ " " ......32 " | 3 " " ......40 "

RATCHET CARRYING JACK SCREWS.



This jack has a steel base, brass nuts, and wrought iron screws and legs. The ratchets, pawls and handles are made of steel and malleable iron.

Capacity, 36 tons.

Diameter of lifting screw, 2¾ inches.

Diameter of traverse screw, 1½ incdes.

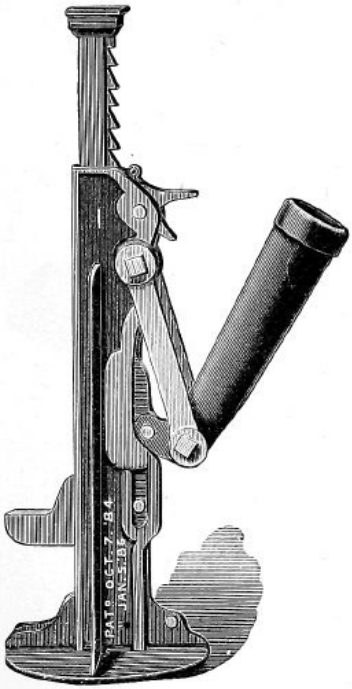
Length of lifting screw, 18 inches.

Length of traverse screw, 18 inches.

Height over all, 26 inches.

Price, **$140.00.**

MAXON PATENT JACKS.



No. 1.

No. 1 JACK.

The height of this Jack is 16 inches, the run of the bar being 10 inches. Size bar, 1⅜x1¼ inches.

Weight of Jack, 32 lbs.

Capacity, 4,000 lbs.

Foot lift, 2,000 lbs.

Price $10 00

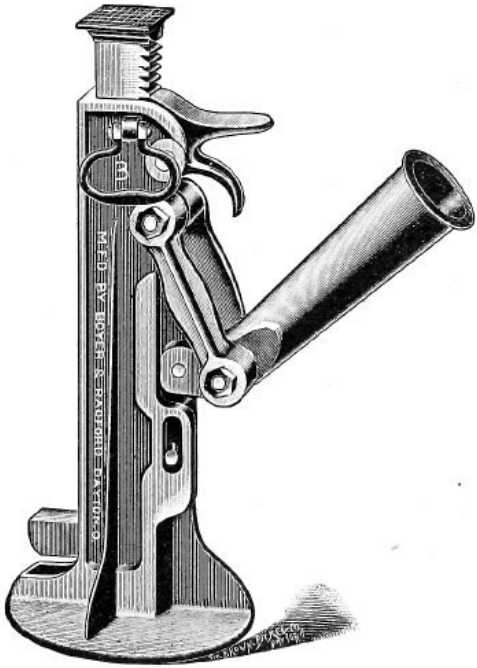
No. 3.
GENERAL PURPOSE JACK.

The height of this Jack is 19 inches, the rise of the bar being 11 inches.

Size of bar, 1¾x1½ inches.

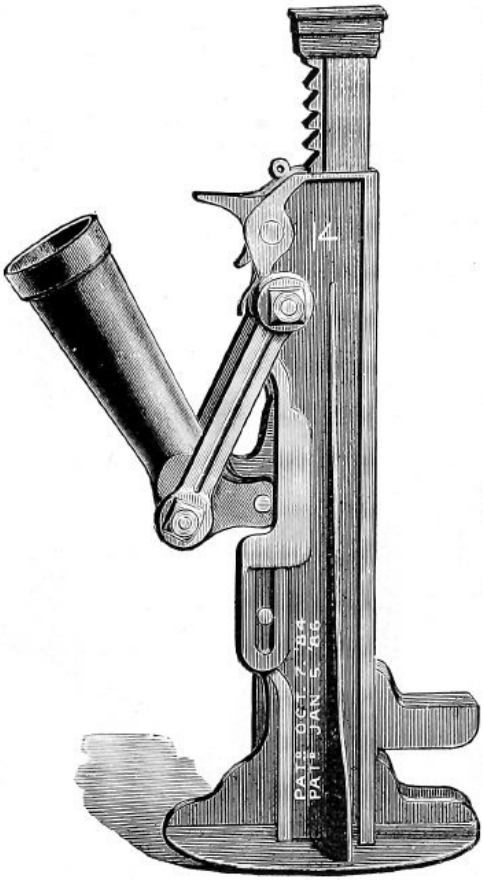
Weight of the Jack, 60 lbs., with a capacity of 8 tons, with foot lift.

Price.....$16 00

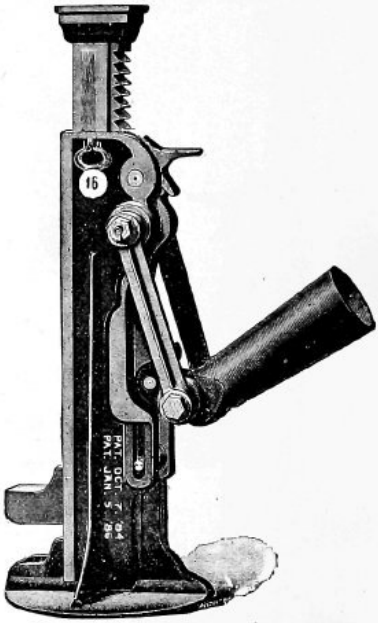


No. 3.

MAXON PATENT JACKS.



No. 14.



No. 16.

No. 16. The height of this Jack is 34 inches, the rise of the bar being 21 inches. Size of bar, 2x2⅜ inches.

Weight of Jack, 125 lbs.

Capacity, 15 tons.

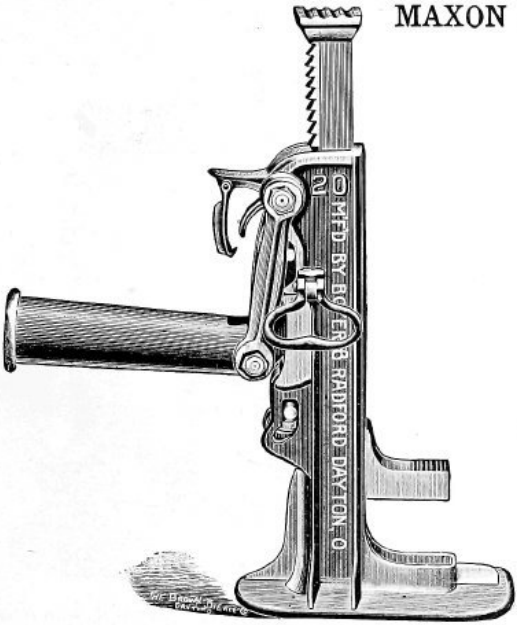
It is a heavy wrecking and coach Jack.

Price $35 00

No. 14. HEAVY JACK. It is used for heavy track and yard work. The height of this Jack is 24 inches, the rise of the bar being 15 inches; size of bar, 1¾x1½ inches. It is strong and durable. Weight of Jack, 70 lbs., capacity 10 tons. Price..... $25 00

No. 15. JACK. The height of this Jack is 28 inches, the rise of the bar being 15 inches; size of bar, 2x2⅜ inches; weight of Jack, 115 lbs., capacity 15 tons. Price..... $35 00

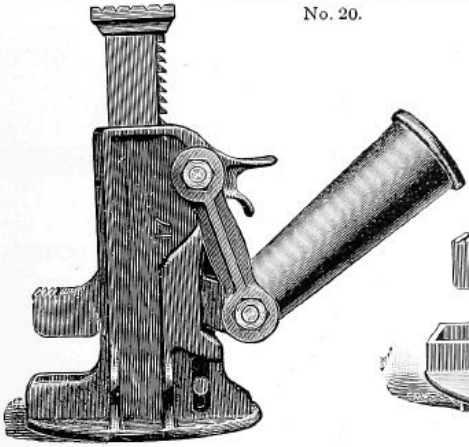
MAXON PATENT JACKS.

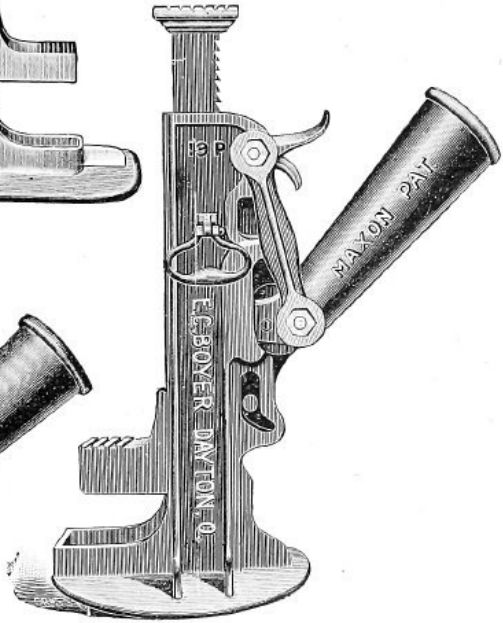


No. 20.

No. 20. DROP TRACK JACK.

Capacity, 10 tons.
Rise, 11½ inches.
Weight, 50 lbs.
Size of bar, 1½x1¾ inches.
Price.....$20 00





No. 17. JOURNAL OR AXLE BOX JACK.

Bar, 1⅝x1⅞ inches; height, 11½ inches; rise, 5 inches; weight, 48 lbs.; capacity, 6 tons. Price.....$16 00

No. 19. POWER JACK.

Height, 28 inches; rise, 15 inches; weight, 120 lbs.; capacity, 20 tons; size of bar, 2x2½ inches.
Price.....$40 00

MAXON PATENT JACKS.

No. 6.

BUILDING AND BRIDGE JACK.

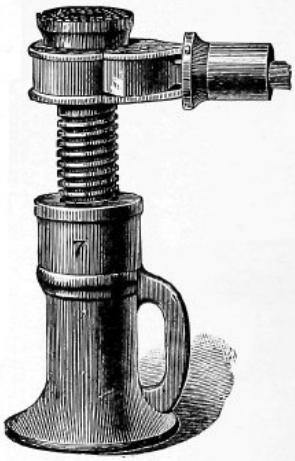
Height, 16 inches; rise, 9 inches; weight, 28 lbs.; capacity, 20 tons; steel screw, 2 inches in diameter; gun metal nut.

Price.....$22 00

No. 9. COACH JACK.

Height, 31 inches; rise, 21 inches; weight, 100 lbs.; capacity, 30 tons; gun metal nut, 4 inches deep; steel screw, 2½ inches in diameter.

Price $60 00



No. 7. LOCOMOTIVE JACK.

Same as No. 8, except that it has iron nut instead of gun metal nut.

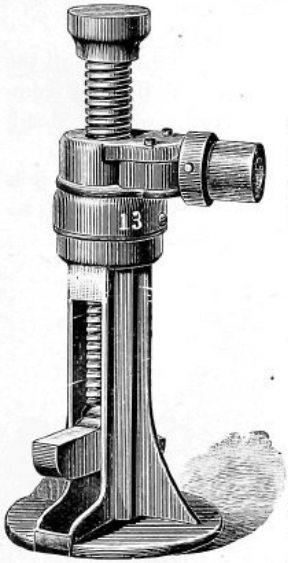
Price $17 00

No. 8. LOCOMOTIVE JACK.

Height, 12 inches; rise, 6 inches; weight, 27 lbs.; capacity, 20 tons; gun metal nut; steel screw, 2 inches in diameter.

Price $20 00

MAXON PATENT JACKS.



No. 13.

No. 13. FOOT LIFT SCREW JACK.

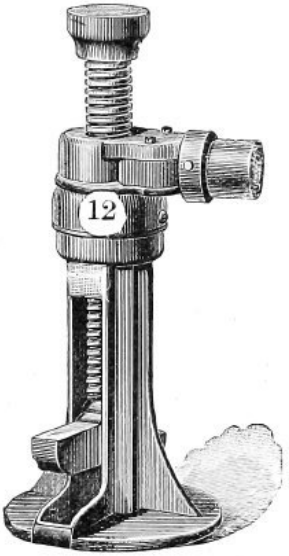
Height, 26 inches; run of screw, 13 inches; diameter of screw, 2½ inches; weight, 100 lbs.; capacity, 30 tons; foot lift, 10 tons; gun metal nut; steel screw, and malleable iron frame and ratchet.

Price.....$75 00

No. 12. FOOT LIFT SCREW JACK.

Height, 31 inches; run of screw, 18 inches; diameter of screw, 2½ inches; weight, 115 lbs.; capacity, 30 tons; foot lift, 10 tons; gun metal nut; steel screw and a malleable iron frame and ratchet.

Price.....$75 00



No. 12.

No. 15. Simplex.

No. 15. SIMPLEX CAR JACK.

Capacity, 15 tons; lift, 17½ inches; height, 28 inches; weight, 82 lbs.; 10 pieces; lifts or lowers by turning indicator on side.

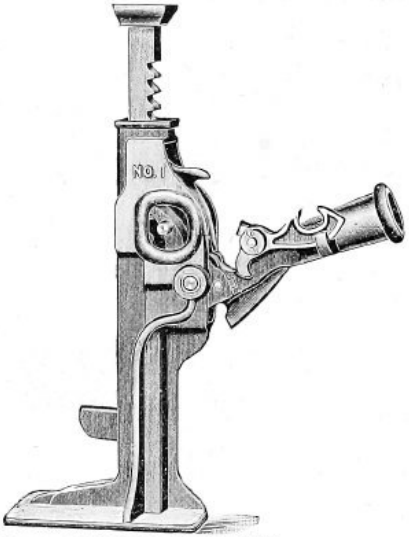
List price.....$35 00

No. 10. SIMPLEX CAR JACK.

Capacity, 10 tons; lift, 12½ inches; height, 21 inches; weight, 60 lbs.; 10 pieces; lifts or lowers by turning indicator on side.

Price.....$25 00

"BUCKEYE" TRACK JACKS.

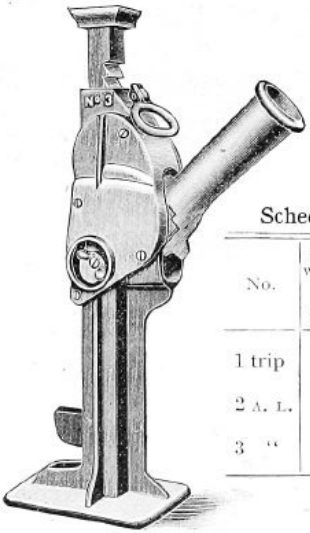


No. 1. TRACK OR TRIP JACK.

The Buckeye Jack combines all the qualities recommended by the committee on Track Jacks of the Roadmasters' Association.

The movements are easy and positive; the materials used in its construction are the best obtainable.

No. 2. AUTOMATIC LOWERING JACK.

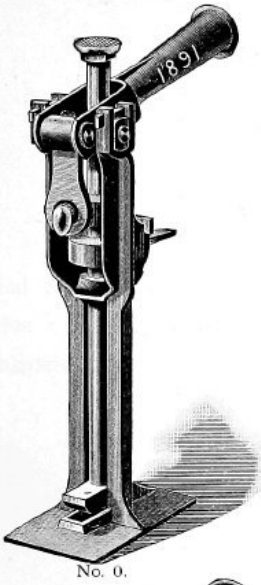


No. 3.
AUTOMATIC LOWERING JACK.

Schedule of Dimensions and Prices of Buckeye Jacks.

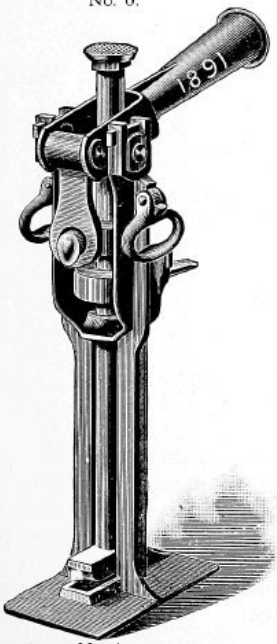
No.	Height with Bar down in inches.	Raise of Bar in inches.	Height with Bar Raised in inches.	Size of Bar in inches.	Weight in lbs.	Capacity in tons.	List price.
1 trip	24	13½	37½	1½x1½	62	10	$18 00
2 A. L.	21	10	31	1⅝x1½	65	10	25 00
3 "	26½	15	41½	1½x1⅝	85	12	30 00

IMPROVED "JENNE" TRACK JACK.



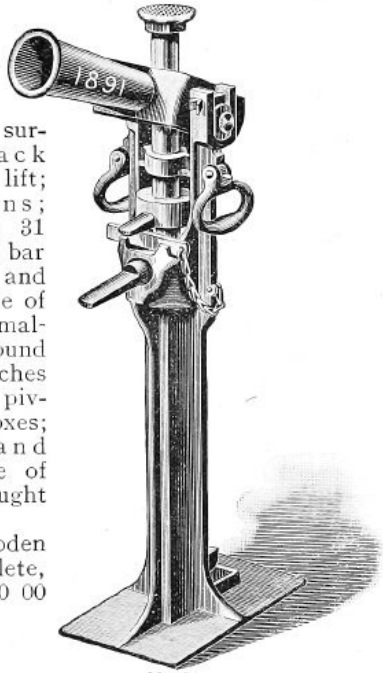
No. 0.

No. 0. For raising low joints and light track repairs; 10 inch lift; weight, 40 lbs.; 27 inches high with bar down; frame and lever socket made of the best air furnace malleable iron; round lifting bar, 1¼ inches in diameter; steel pivots; bronze boxes; rings, hanger and lifting bar made of the best refined wrought iron. Price, with wooden lever, complete ..... each, $16 00



No. 1.

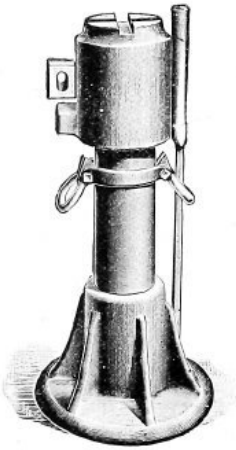
No. 1. For surfacing and track repairs; 12 inch lift; capacity, 5 tons; weight, 60 lbs.; 31 inches high with bar down; frame and lever socket made of best air furnace malleable iron; round lifting bar, 1½ inches diameter; steel pivots; bronze boxes; rings, hanger and lifting bar made of best refined wrought iron.
Price, with wooden lever, complete, each $20 00



No 2.

No. 2. For heavy ballasting, surfacing and general track repairs; 15 inch lift; capacity, 10 tons; weight, 90 lbs.; 35 inches high with bar down; frame and lever socket made of best air furnace malleable iron; round lifting bar, 1¾ inches in diameter; steel pivots; bronze boxes; rings, hanger and lifting bar made of best refined wrought iron. Price, with wooden lever, complete ..... each, $24 00

BROAD BASE HYDRAULIC JACK.



The increased area of the base in this style Jack gives it a solid foundation for use where steadiness is required.

CAPACITY	RAISE.	HEIGHT WHEN DOWN	DIAMETER OF BASE.	WEIGHT.	PRICE.
4 tons.	12 inches.	24 inches.	9½ inches.	67 lbs.	$ 62 00
7 tons.	12 inches.	25 inches.	10 inches.	85 lbs.	68 00
7 tons.	18 inches.	31 inches.	10 inches.	97 lbs.	74 00
7 tons.	24 inches.	37½ inches.	10 inches.	110 lbs.	80 00
10 tons.	12 inches.	25 inches.	12 inches.	120 lbs.	76 00
10 tons.	18 inches.	31 inches.	12 inches.	130 lbs.	88 00
10 tons.	24 inches.	37¾ inches.	12 inches.	150 lbs.	100 00
15 tons.	12 inches.	25½ inches.	12 inches.	145 lbs.	100 00
15 tons.	18 inches.	31½ inches.	12 inches.	162 lbs.	116 00
15 tons.	24 inches.	38 inches.	12 inches.	185 lbs.	132 00
20 tons.	12 inches.	26½ inches.	13 inches.	180 lbs.	124 00
20 tons.	18 inches.	32½ inches.	13 inches.	206 lbs.	144 00
20 tons.	24 inches.	38½ inches.	13 inches.	231 lbs.	164 00
30 tons.	9 inches.	22½ inches.	13½ inches.	208 lbs.	152 00
30 tons.	12 inches.	26½ inches.	13½ inches.	220 lbs.	162 00
30 tons.	18 inches.	32½ inches.	13½ inches.	250 lbs.	190 00
40 tons. All Steel	12 inches.	26¾ inches.	13¾ inches.	260 lbs.	200 00
40 tons. All Steel	18 inches.	33 inches.	13¾ inches.	294 lbs.	230 00
50 tons. All Steel	12 inches.	28 inches.	15 inches.	320 lbs.	240 00
50 tons. All Steel	18 inches.	34½ inches.	15 inches.	355 lbs.	270 00

PLAIN HYDRAULIC JACK.

This style is intended for use where a firm foundation can be secured, and for operating in close spaces that will not admit a jack with a larger base.

CAPACITY.	RAISE.	HEIGHT WHEN DOWN	SIZE OF BASE.	WEIGHT.	PRICE.
4 tons.	12 inches.	24½ inches.	4¼ in. square.	55 lbs.	$ 58 00
5 tons.	4 inches.	12 inches.	4¼ in. square.	27 lbs.	50 00
7 tons.	12 inches.	25¼ inches.	4½ in. square.	67 lbs.	62 00
7 tons.	18 inches.	31¼ inches.	4½ in. square.	77 lbs.	68 00
7 tons.	24 inches.	38 inches.	4½ in. square.	95 lbs.	74 00
10 tons.	12 inches.	25¼ inches.	6 in. square.	97 lbs.	66 00
10 tons.	18 inches.	31¼ inches.	6 in. square.	110 lbs.	76 00
10 tons.	24 inches.	38 inches.	6 in. square.	128 lbs.	86 00
15 tons.	12 inches.	25½ inches.	6½ in. square.	118 lbs.	82 00
15 tons.	18 inches.	31½ inches.	6½ in. square.	135 lbs.	96 00
15 tons.	24 inches.	38 inches.	6½ in. square.	155 lbs.	110 00
20 tons.	12 inches.	26½ inches.	7 in. square.	150 lbs.	96 00
20 tons.	18 inches.	32½ inches.	7 in. square.	174 lbs.	118 00
20 tons.	24 inches.	38½ inches.	7 in. square.	197 lbs	140 00
30 tons.	9 inches.	22½ inches.	8¼ in. square.	176 lbs.	128 00
30 tons.	12 inches.	26 inches.	8¼ in. square.	188 lbs.	136 00
30 tons.	18 inches.	32 inches.	8¼ in. square.	220 lbs.	160 00
40 tons. All Steel	12 inches.	26½ inches.	9 in. square.	240 lbs.	176 00
40 tons. All Steel	18 inches.	33 inches.	9 in. square.	272 lbs.	200 00
50 tons. All Steel	12 inches.	27 inches.	10 in. round.	270 lbs.	206 00

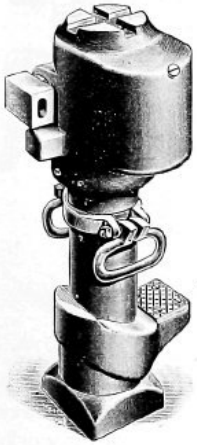
CLAW HYDRAULIC JACK.

The claw on this style, being close to the ground, is intended for raising loads that are not of sufficient height to admit the head of jack.

CAPACITY.	RAISE.	HEIGHT WHEN DOWN.	HEIGHT OF CLAW	WEIGHT.	PRICE.
4 tons.	12 inches.	24½ inches.	5 inches.	78 lbs.	$66 00
7 tons.	12 inches.	25 inches.	5 inches.	96 lbs.	74 00
7 tons.	18 inches.	30½ inches.	5 inches.	110 lbs.	80 00
10 tons.	12 inches.	26 inches.	6 inches.	145 lbs.	84 00
10 tons.	18 inches.	32 inches.	6 inches.	162 lbs.	94 00
15 tons.	12 inches.	25¾ inches.	6½ inches.	173 lbs.	120 00
15 tons.	18 inches.	32 inches.	6½ inches.	195 lbs.	136 00
20 tons.	12 inches.	26½ inches.	6½ inches.	205 lbs.	160 00
20 tons.	18 inches.	32½ inches.	6½ inches.	245 lbs.	180 00
30 tons.	12 inches.	26½ inches.	8 inches.	275 lbs.	200 00
40 tons. All Steel	12 inches.	26½ inches.	8 inches.	320 lbs.	240 00

"HORIZONTAL" CLAW HYDRAULIC JACK.

This Jack is of the same style as the regular Claw Jack, other than reservoir in head is of sufficient capacity to keep pump submerged when Jack is operated horizontally, making Jack better adapted for horizontal use, although it will lift equally as well vertically.

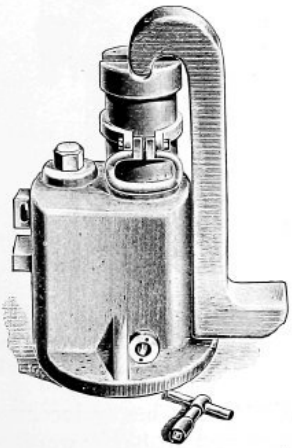


CAPACITY.	RAISE.	HEIGHT WHEN DOWN.	HEIGHT OF CLAW.	WEIGHT.	PRICE.
7 tons.	12 inches.	25 inches.	5 inches.	105 lbs.	74 00
7 tons.	18 inches.	30½ inches.	5 inches.	120 lbs.	80 00
10 tons.	12 inches.	26 inches.	6 inches.	155 lbs.	84 00
10 tons.	18 inches.	32 inches.	6 inches.	170 lbs.	94 00
15 tons.	12 inches.	25¾ inches.	6½ inches.	190 lbs.	120 00
15 tons.	18 inches.	32 inches.	6½ inches.	215 lbs.	136 00
20 tons.	12 inches.	26½ inches.	6½ inches.	230 lbs.	160 00
20 tons.	18 inches.	32½ inches.	6½ inches.	270 lbs.	180 00
30 tons.	12 inches.	26½ inches.	8 inches.	305 lbs.	200 00
40 tons.	12 inches.	26½ inches.	8 inches	350 lbs.	240 00

"HORIZONTAL" OR "LOW" HYDRAULIC JACK.

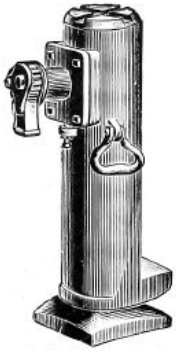
So called as they will run out as far horizontally as vertically, and their heights are about 5 inches less than the regular styles.

When desired, a wrought iron claw can be used for raising loads that are close to the ground.

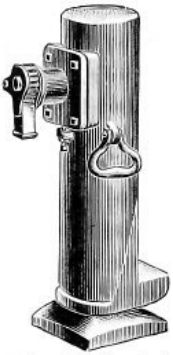


Capacity.	Rise.	Height when Down.	Diameter of Base.	Weight.	Price.	Extra for Claw.
7 tons.	12 in.	20 in.	9x5½ in.	100 lbs.	$65.00	$ 8.00
7 tons.	18 in.	26 in.	9x5½ in.	115 lbs.	75.00	10.00
10 tons.	12 in.	20 in.	10 in.	140 lbs.	80.00	8.00
10 tons.	18 in.	26 in.	10 in.	155 lbs.	95.00	10.00
10 tons.	24 in.	32 in.	10 in.	170 lbs.	110.00	12.00
15 tons.	12 in.	20 in.	12 in.	180 lbs.	100.00	10.00
15 tons.	18 in.	26 in.	12 in.	200 lbs.	120.00	12.00
15 tons.	24 in.	32 in.	12 in.	220 lbs.	140.00	14.00
20 tons.	12 in.	20 in.	12 in.	190 lbs.	120.00	12.00
20 tons.	18 in.	26 in.	12 in.	220 lbs.	145.00	15.00
20 tons.	24 in.	32 in.	12 in.	250 lbs.	170.00	18.00
30 tons.	12 in.	21 in.	13 in.	245 lbs.	145.00	16.00
30 tons.	18 in.	27 in.	13 in.	280 lbs.	170.00	21.00
40 tons.	12 in.	21 in.	13 in.	300 lbs.	165.00	20.00
40 tons.	18 in.	27 in.	13 in.	335 lbs.	190.00	25.00
50 tons.	12 in.	21 in.	14 in.	345 lbs.	190.00	22.00
50 tons.	18 in.	27 in.	14 in.	375 lbs.	215.00	27.00
80 tons.	12 in.	22 in.	18 in.	425 lbs.	240.00	30.00

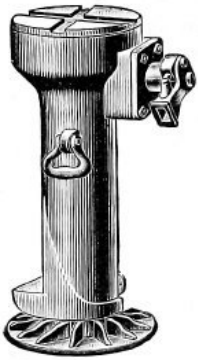
BALL-BEARING JACKS.



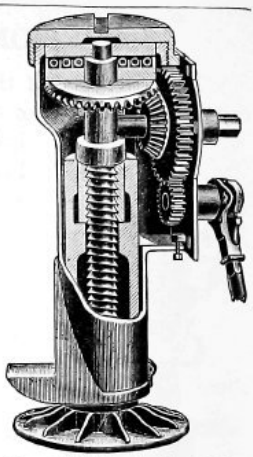
22 inch Bridge Jack, 15, 25, 35 Ton.



26 inch Bridge Jack, 25 Ton.



50 Ton Bridge Jack.

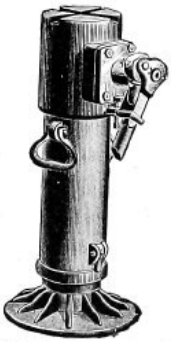


60 and 70 Ton Bridge Jack.

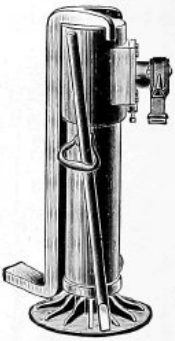
Capacity.	Height.	Rise.	Diameter of Base.	Diameter of Head.	Weight.	List Price.
15 tons	22 in.	10 in.	8x9 in.	5½ in.	110 lbs.	$ 60 00
25 "	26 "	13 "	8x9 "	5½ "	157 "	96 00
25 "	22 "	10 "	8x9 "	5½ "	136 "	90 00
35 "	22 "	10 "	10x8 "	6½ "	190 "	130 00
50 "	27 "	13 "	14 "	10½ "	292 "	150 00
60 "	26 "	12 "	14 "	10½ "	323 "	175 00
70 "	26 "	12 "	14 "	10½ "	323 "	200 00

These Jacks are designed for extra heavy bridge and other work, and are made with great care from the best material, and the capacity is fully guaranteed.

Style "C," 31 inch, 35 Ton.
Price.....$135 00

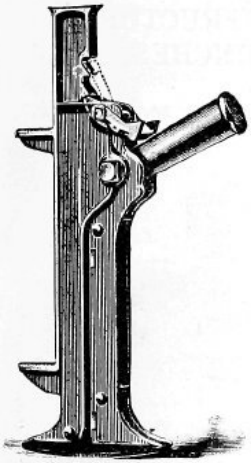


Style "C," 26 inch, 35 Ton.
Price.....$125 00



Style N. A. with Hook.
Price.....$85 00
Hook extra..... 6 00

These Jacks are designed for heavy locomotive and wrecking-car service and all heavy work.



AUTOMATIC TRIP JACK.

For Mines, Railroads, Stone Yards, Threshers and all heavy work.

No. 14. Weight, 30 lbs.; will raise vehicles weighing 10 tons.

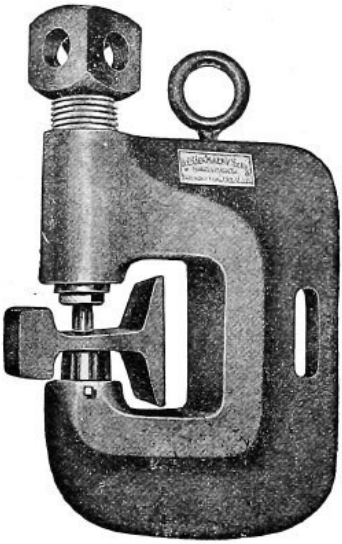
Price .....net, $4 75

WINDLASS STONE JACKS.

With improved bottom or base, which allows the foot or claw to run down to ¼ inch of the ground.

Can be set at any angle without danger of slipping.

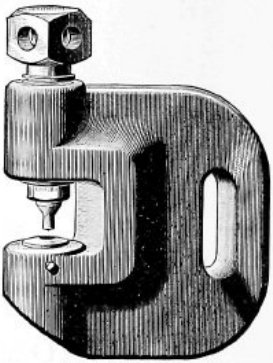
CAPACITY	HEIGHT.	WEIGHT.	PRICE EACH.
3 tons	3 ft. ½ in.	95 lbs.	$ 50.00
4 "	3 " 1 "	100 "	55.00
5 "	3 " 1½ "	110 "	62.00
6 "	3 " 2 "	125 "	70.00
7 "	3 " 2½ "	135 "	77.50
8 "	3 " 3 "	145 "	84 50
10 "	3 " 3½ "	160 "	110.00
12 "	3 " 4 "	170 "	120 00
15 "	3 " 5 "	185 "	140.00
18 "	3 " 5 "	200 "	150.00
20 "	3 " 5 "	225 "	162.50
25 "	3 " 5 "	250 "	175.00
30 "	3 " 6 "	285 "	200.00



Rail and Structural Iron Punch.

RAIL AND STRUCTURAL IRON PUNCHES.

Special designs made for special work.
Prices quoted on application.



Steel Screw Punch.

STEEL SCREW PUNCHES.

These Punches are made of the highest grade steel castings, having a tensile strength of 80,000 lbs. per square inch. The metal is placed where it will do the most good, which is not easily attained in forgings.

PRICE LIST OF SCREW PUNCHES.

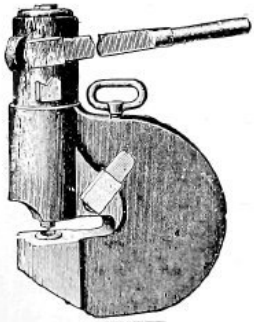
No. 0.	Punches	½	inch hole in	¼	inch iron,	1½	inches from edge of sheet,			15 lbs.,	$24 00
No. 1.	"	½	"	"	⅜	"	1½	"	"	"	27 "	30 00
No. 2.	"	¾	"	"	½	"	2	"	"	"	40 "	40 00
No. 3.	"	¾	"	"	¾	"	2½	"	"	"	62 "	60 00
No. 3½.	"	¾	"	"	¾	"	4	"	"	"	95 "	75 00
No. 4.	"	1	"	"	1	"	4¼	"	"	"	145 "	90 00

PRICE LIST OF PUNCHES AND DIES.

For No. 0 Screw Punch										per pair (Punch and Die),		$3	50
" No. 1 and 2 Screw Punches										"	"	4	00
" No. 3 " 3½ "										"	"	5	00
" No. 4 Screw Punch, ¾ inch Punches and under										each,		2	50
" No. 4 " " ⅞ "									over	"		3	50
" No. 4 " " Dies of all sizes										"		3	50

In ordering Punches and Dies it is only necessary to give the size of rivets for which they are to be used.

HYDRAULIC HEAD PUNCH.

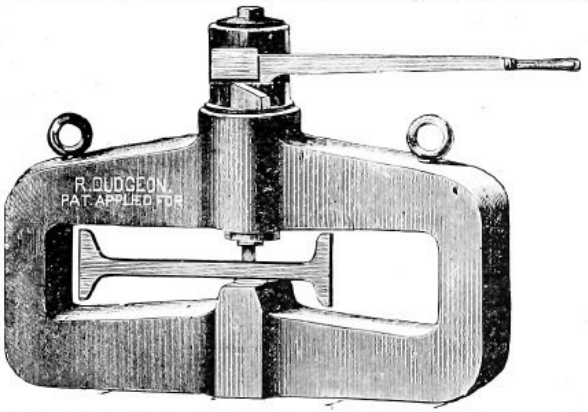


REGULAR SIZES.

No.	Thickness	Rivet	* Gap	Weight	Price	Code	* Gap	Price
0	¼	⅝	2	40	$ 70	Kedge	3½	$ 80
1	⅜	⅝	2	50	80	Ketch	3½	90
2	½	⅝	2	60	100	Knack	3½	110
3	½	¾	2	70	120	Knarl	3½	140
4	⅝	¾	2	90	150	Knave	3½	170
5	¾	⅞	2	120	200	Knead	3½	220
7	1	1	2	280	250	Kneel	4	275

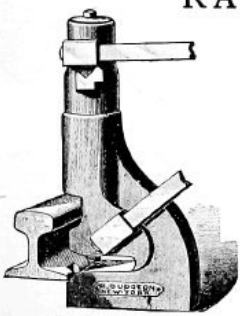
* Gap refers to distance from edge of sheet to center of hole.
Greater distance to order.

BEAM PUNCH, for punching I Beams, Angles, Ts, Channels, etc.



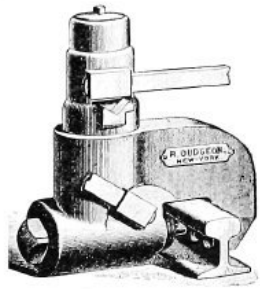
No.	Beam	Thickness	Rivet	From Center of Punch to Side	Weight	Price	Code
1	12	½	¾	9½	450	$325	Label
2	15	1	1	12¾	575	375	Laird
3	20	1	1	17¾	750	425	Lance

RAIL PUNCHES.



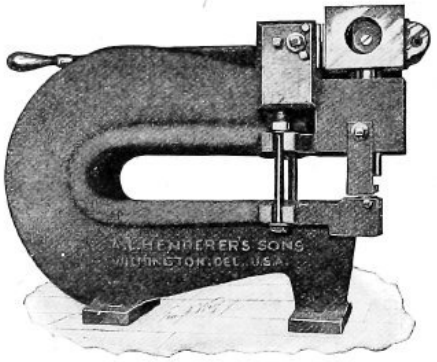
SPIKE PUNCH.

Prices on Application.



FISH PLATE PUNCH.

SHEET METAL PUNCH.



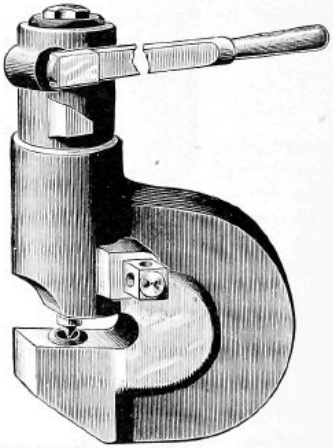
Will punch ¼ inch holes in No. 12 iron 15 inches from edge of sheet, or by using the stay bolts, it will punch ¼ inch holes in ¼ inch iron 4 inches from edge of sheet.

This Punch can be furnished with a Shear and Wire Cutter attachment as shown in cut. Shear is for iron 3/16 thick and 2 inches wide or, by reversing, 4 inches wide, and Cutter is for wire up to ¼ inch diameter.

Price includes 3 punches and dies, any size under ½ inch, ⅜, 3/16 and ¼ inch being furnished if not otherwise ordered. Weight 130 lbs.

Price of Punch without Shear and Wire Cutter.....$20 00
" " with " " " " 25 00

HYDRAULIC HEAD PUNCH.



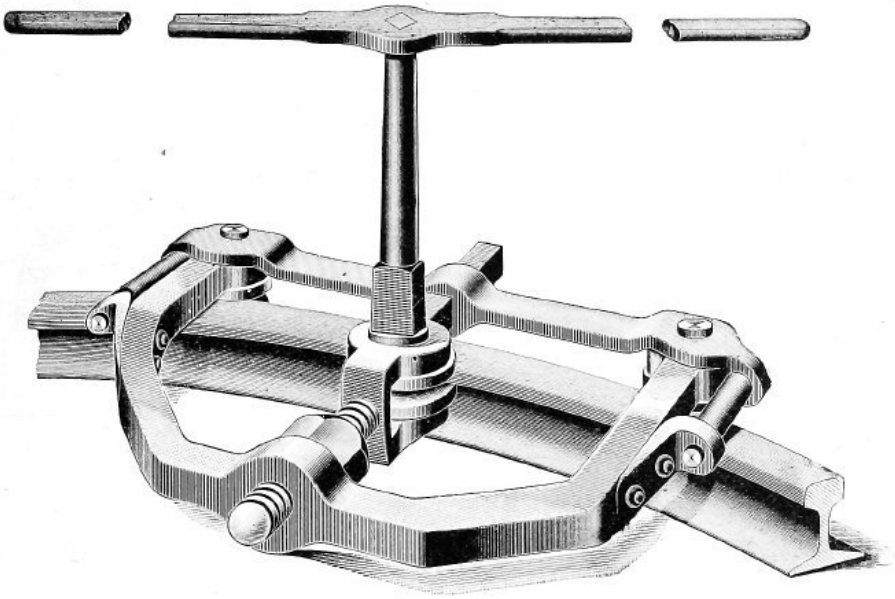
This Punch is constructed similar to a Jack, being an improvement over the old style Hydraulic Screw Punch.

It is fitted with a Pinion meshed into a Rack cut on the Ram, to withdraw Punch from metal after punching.

PRICE LIST OF HYDRAULIC HEAD PUNCHES.

No. 1.	Punches	⅝	inch hole in	⅜	inch iron,	1¾	inches from edge of sheet,		50	lbs.,	$ 60 00
No. 2.	"	¾	"	"	"	½	"	"	2	"	"	"	"	"	85	"	85 00
No. 2½.	"	¾	"	"	"	½	"	"	5	"	"	"	"	"	130	"	100 00
No. 3.	"	¾	"	"	"	¾	"	"	2¼	"	"	"	"	"	130	"	120 00
No. 4	"	1	"	"	"	¾	"	"	2½	"	"	"	"	"	160	"	140 00

ROLLER RAIL BENDER AND STRAIGHTENER.



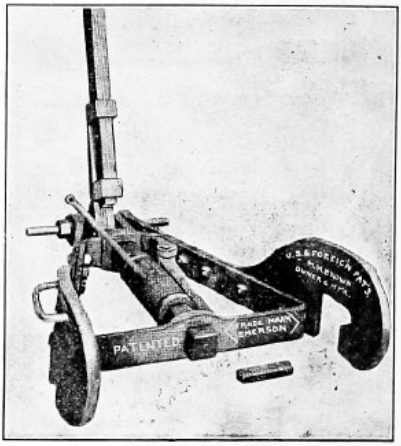
No. 1.	For rail 20 to	40	lbs.,	inclusive	.....	$105	00
No. 2.	" " 41 "	60	"	"	.....	115	00
No. 3.	" " 61 "	70	"	"	.....	140	00
No. 4.	" " 71 "	80	"	"	.....	180	00
No. 5.	" " 81 "	90	"	"	.....	230	00
No. 6.	" " 91 "	100	"	"	.....	400	00

Always send tracing of rail section with order.

We can furnish these benders WITH HORSE POWER ATTACHMENT at a slight additional cost.

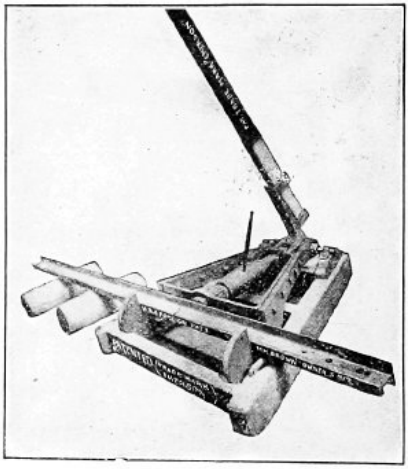
THE EMERSON PATENT
RAIL BENDING AND STRAIGHTENING MACHINES.

No. 3 for Tee Rails.



No. 4 for Tee Rails.

Made of Wrought Iron and Wrought Steel.



Quick and True in Action.

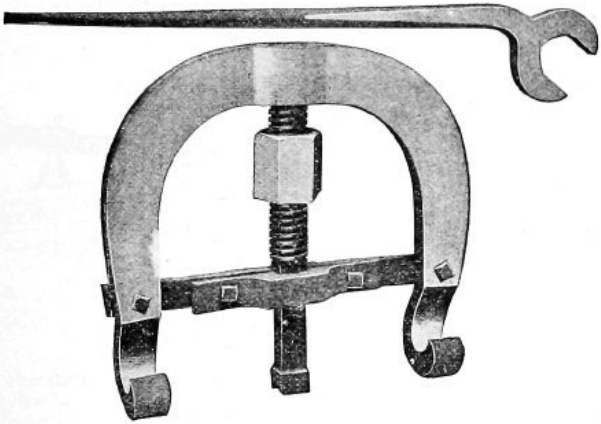
The above cut shows the jaws of the Bender ready to receive a rail for TOP or SURFACE bending or straightening. Jaw Dies supplied on order when line curving is desired.

Tee Rail Sizes.

THERE ARE FOUR (4) SIZES:

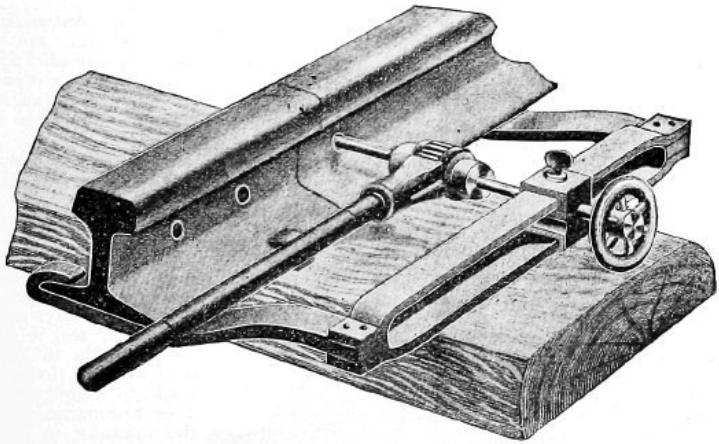
No. 1.	For tee rails	up	to	45	lbs.	to	the	yard	.....	price, net,	$125	00
No. 2.	"	"	"	45	"	65	"	"	"	.....	"	150	00
No. 3.	"	"	"	65	"	90	"	"	"	.....	"	180	00
No. 4.	"	"	"	90	"	115	"	"	"	.....	"	220	00

"ZELNICKER" RAIL BENDER OR JIM CROW.



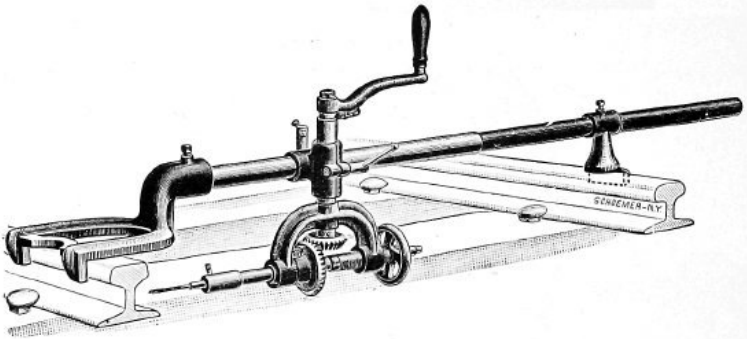
Size No.	1	2	3	4	5	
For steel rails up to	25	40	60	80	100	lbs.
Price, each	$24 00	30 00	36 00	60 00	75 00	

"BELAND" TRACK DRILL.



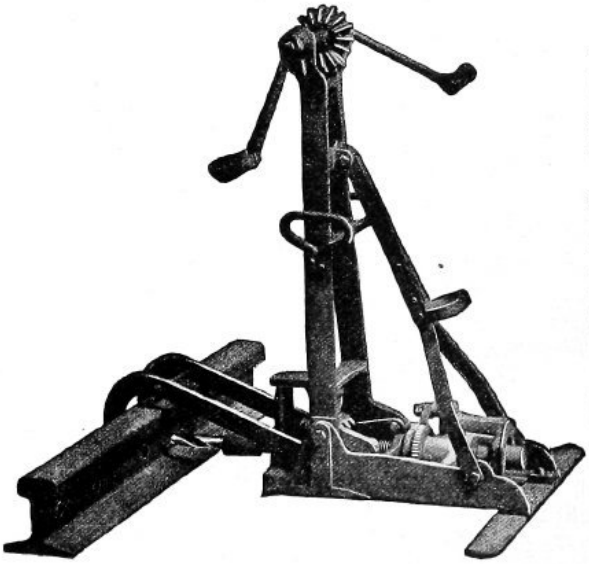
A light and serviceable tool for the drilling of all holes for a joint without moving the clamp. Weight 27 lbs.
Price complete as shown.....each, $10 00

MILLER'S FALLS TRACK DRILL No. 5.



A convenient machine for drilling rails for bonding wire, etc. Two sets of gears go with each drill, making it either speeded or back geared. Weighs 68 lbs., and will carry drills up to 1 inch. A chuck is furnished with each machine which will hold drills smaller than ¼ inch.
Price.....$25 00

PAULUS' AUTOMATIC FEED TRACK DRILL.



No. 1.

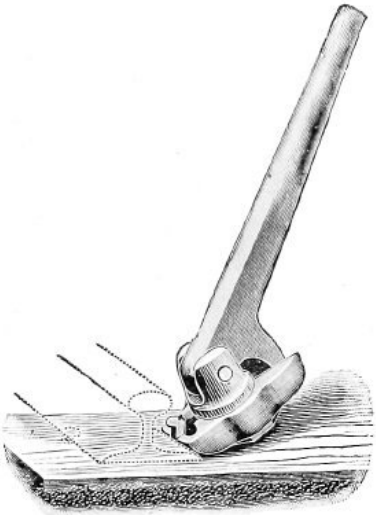
These Automatic Feed Track Drills are the only practical devices known whereby the operator is able to stand in an erect position while drilling holes in rails and angle bars.

A great saving in both time and labor is effected by use of these machines, one man being able to easily drill five holes with one of them in the same time in which one hole can be made with the ordinary ratchet drill. They require no adjustment, are always ready for instant use, and it takes but a few seconds to collapse the drill and to throw back the hooks to enable a train to pass. The automatic feed enables the operator to drill through the web of the heaviest rail section without stopping.

Price with one drill bit..$22 00

Weight, 60 lbs.

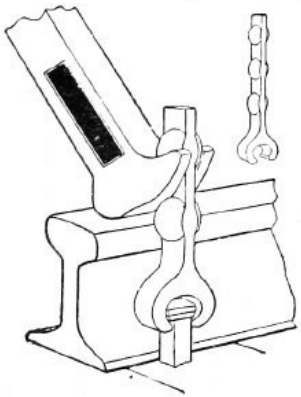
"MOGUL" SPIKE AND BOLT PULLER.



An improved Claw Bar. Drop forged from steel.
Handle 5 feet long.

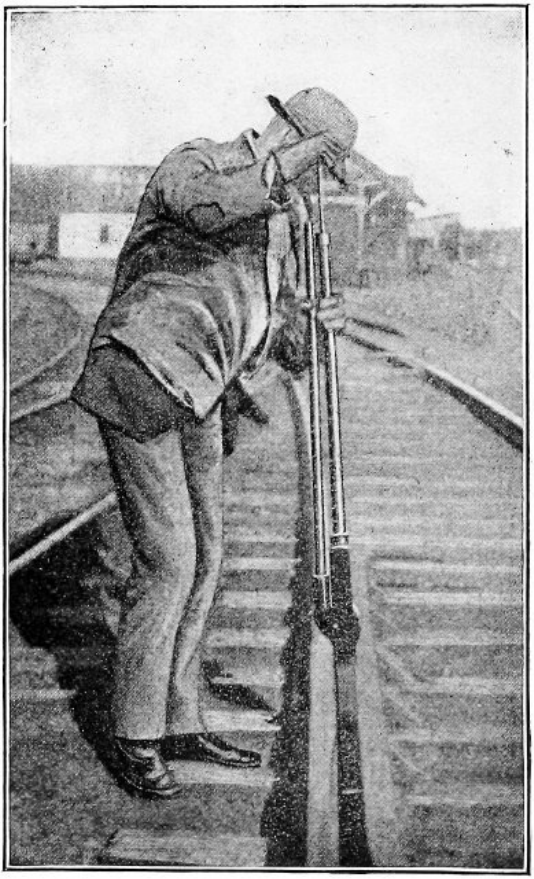
Price.....$5 00

SPIKE PULLERS (2 or 3 Ball).



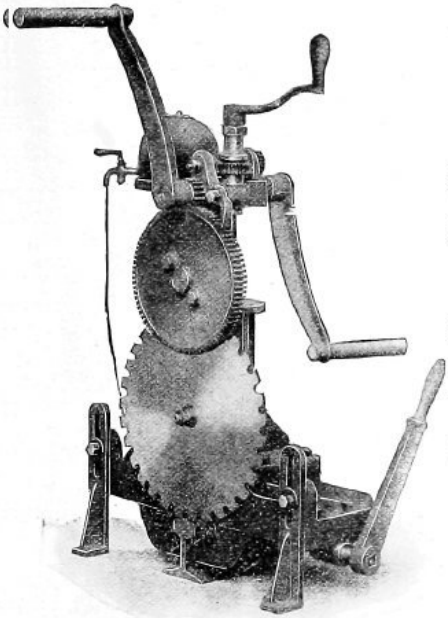
No. 4. Fits any claw bar. Pulls spikes between guard rails....per lb., $0 40

PEARSON "CYCLONE" SPIKE PULLER.



This tool is designed to pull spikes from on bridges, trestles, embankments; and in tunnels and yards; and from between guard rails, switches, frogs, tie plates, brace plates, etc. The accompanying cuts tell all the story. Will pull from ¼ inch to 1 inch spikes.

Height, 3 feet 10 inches. The lever handle is 3 feet long. The weight is a little under 30 lbs.



BRYANT PORTABLE RAIL SAWS, Nos. 5 and 6.

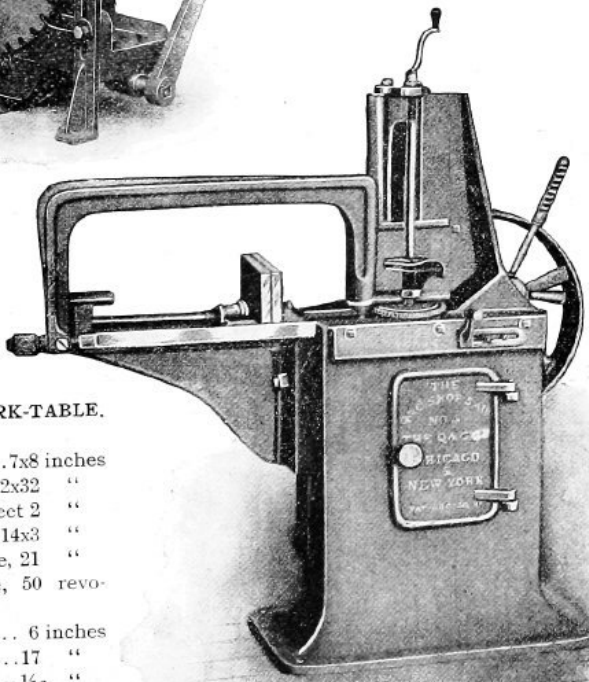
No. 5.

Diameter of saw blade.....16 inches
Thickness " " " .....3/16 "
Capacity, steam rails.....100 lbs.
Weight .....256 "

No. 6.

Diameter of saw blade.....20½ inches
Thickness " " " ..... ¼ "
Capacity, street rails.....9-inch girder
Weight.....310 lbs.

Furnished complete with saw grinder, 2 saw blades, and all necessary wrenches.



THE Q & C No. 4 SHOP SAW.

ADJUSTABLE WORK-TABLE.

Capacity, solids.....7x8 inches
Floor space.. ....12x32 "
Height over all..3 feet 2 "
Size of pulley.....14x3 "
Height of work-table, 21 "
Speed per minute, 50 revolutions.
Stroke of saw blade.. 6 inches
Length " " " ..17 "
Thickness " " ..1/16 "
Weight .....250 lbs.

RAILROAD TRACK BOLTS.

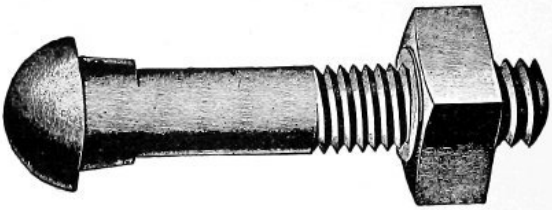


Fig. 1462.
Cut of Square Nut, Button Head.

Fig. 1463.
Cut of Hexagon Nut, Button Head.

Oval neck, button head, square or hexagon nuts. Average number in keg of 200 lbs.

Size Bolt, inches.	Size Nut, inches.	Sq. Nuts.	Hex. Nuts.	Size Bolt, inches.	Size Nut, inches.	Sq. Nuts.	Hex. Nuts.	Size Bolt, inches.	Size Nut, inches.	Sq. Nuts.	Hex. Nuts
½x2	1 x½	793	820	¾x3	1¼x¾	276	286	¾x4¼	1¼x¾	234	240
½x2½	1 x½	733	760	¾x3	1⅜x⅜	260	270	¾x4¼	1⅜x¾	215	228
⅝x2¼	1⅛x⅝	547	593	¾x3¼	1¼x¼	266	275	⅞x4	1⅛x⅞	163	173
⅝x2½	1⅛x⅝	515	555	¾x3½	1⅜x¼	243	261	⅞x4	1½x⅞	161	170
⅝x2½	1⅛x⅝	460	498	⅞x3½	1¼x¼	258	266	⅞x4¼	1⅛x⅞	159	168
¾x2½	1¼x¾	390	425	⅞x3½	1⅜x¼	236	253	⅞x4¼	1½x⅞	157	165
¾x2¾	1⅛x¾	448	479	⅞x3¾	1¼x¼	249	257	⅞x4½	1⅛x⅞	155	163
¾x2¾	1¼x¾	379	410	⅞x3¾	1⅜x¼	229	244	⅞x4½	1½x⅞	153	160
⅞x3	1⅛x⅞	436	459	1x4	1¼x¼	241	248	1x4¾	1⅛x⅞	151	158
⅞x3	1¼x⅞	366	395	1x4	1⅜x¼	222	236	1x4¾	1½x⅞	149	166

STEEL RAILROAD SPIKES.

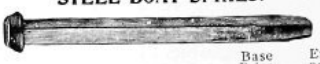
Size Measured Under Head.	Average No. per Keg of 200 lbs.	Ties 2 Feet Between Centers, 4 Spikes per Tie, makes per Mile.	Rails Used, Weight per Yard.
5½x$\frac{9}{16}$	375	5,870 lbs.—29½ kegs.	45 to 70
5 x$\frac{9}{16}$	400	5,170 lbs.—26 " "	40 to 56
5 x½	450	4,660 lbs.—23½ " "	35 to 40
4½x½	530	3,960 lbs.—20 " "	28 to 35
4 x½	600	3,520 lbs.—17¾ " "	24 to 35
4½x$\frac{9}{16}$	680	3,110 lbs.—15½ " "	20 to 30
4 x$\frac{9}{16}$	720	2,910 lbs.—14¾ " "	
3½x$\frac{9}{16}$	900	2,350 lbs.—11 " "	16 to 25
4 x⅜	1,000	2,090 lbs.—10½ " "	
3½x⅜	1,190	1,780 lbs.— 9 " "	16 to 20
3 x⅜	1,240	1,710 lbs.— 8½ " "	
2½x⅜	1,342	1,575 lbs.— 7⅞ " "	12 to 16
2½x$\frac{7}{16}$	2,200	1,000 lbs.— 5 " "	8 to 10

RAILROAD SPIKES.

PRICES.	Base Price.	Extra. per lb.
4½, 5 and 5½ by $\frac{9}{16}$	$.....	.....
3½, 4, 4½ and 5 by ½	.....	$0.05
3½, 4 and 4½ by $\frac{7}{16}$	.....	.10
3, 3½, 4 and 4½ by ⅜	.....	.20
2½ by ⅜	.....	.30
2½, 3 and 3½ by $\frac{7}{16}$	.....	.45
2 by $\frac{7}{16}$	.....	.70

Reverse points ¼c extra (smallest, 3 by ⅜).

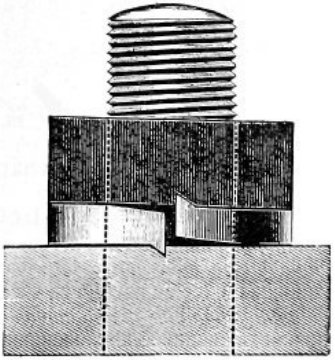
STEEL BOAT SPIKES.

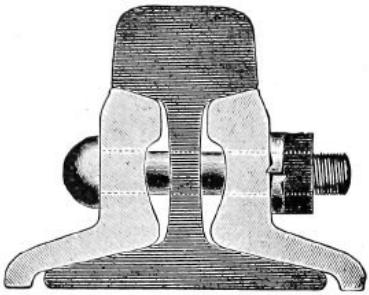


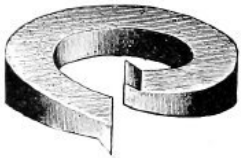
		Base Price.	Extra. per lb.
¼ inch square,	12 to 24	in length..... $.....	.....
⅜ " "	8 to 16	"	.....
½ " "	6 to 16	"	$0.10
⅝ " "	6 to 12	"	.20
¾ " "	4 to 12	"	.25
⅞ " "	4 to 8	"	.35
1" "	4 to 8	"	.65
¼ " "	4 to 8	"	.90
¼ " "	3 to 3½	"	

⅜ and ⅞ shorter than 4 inches. ¼c extra.

The Positive Lock Washer.

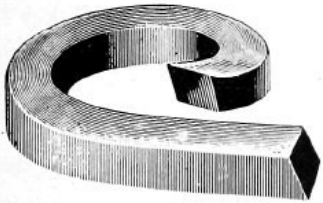


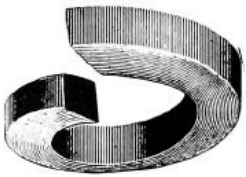




Size Bolt.....	½	⅝	¾	⅞	1	1⅛	1¼
Per 1000.....	$9.50	9.50	13.00	14.00	16.00	17.00	17.50

VERONA NUT LOCK.





Packed in boxes of 1,000 or 1,500, as desired.

For use on Fish-Plates, Cars, Locomotives, Switches and every place where it is necessary to have a perfectly tight nut.

It is made of the best steel, oil tempered, and each one carefully tested and inspected.

It costs no perceptible time to apply it, and cannot be put on wrong. It is very elastic and made of the most durable material.

After years of use it will be found to retain its elasticity, and, when taken off for repair of track, can be applied again.

At present there are over 200,000,000 of these Locks in use on our best Railroads, and the universal opinion, expressed by all practical men who have seen and used it, is that nothing has been made to equal it.

Price..... .....per M., $.....

RAIL DEPARTMENT.

NEW RAIL. A very important branch of our business is our Rail Department. We feel at liberty to say that we handle a larger tonnage of light section rail from 8 pounds to 45 pounds per yard than any other dealer in the United States. The rails that we handle are rolled from the best Bessemer steel billets (not scrap). We are at all times in position to make prompt shipment from our warehouse stock at East St. Louis, Mobile and New Orleans yards. We also have large contracts with mills covering delivery the year around from our mill stock.

TERMS. We sell both for cash and on our "Zelnicker" Time Payment Plan, *i. e.*, to responsible parties, we will accept a payment of one-third cash, balance in notes to run two, four and six months, with interest on deferred payments, we to retain a first lien on the rail until last note shall have been paid.

ACCESSORIES. We also handle the necessary splices, angles, spikes, bolts, braces, frogs, switches and crossings.

RELAYING OR SECOND-HAND RAIL.

We also buy and sell choice relaying rails, all sections, and when we say *choice relayers*, we mean rail that for all practical usages and purposes is as good as new and which will stand our customers' or Hunt's inspection. Some dealers represent that they handle good relaying rail, but when they sell you, they only expect to do so that one time. We, on the other hand, take as much pride in furnishing you a first quality relaying rail and one that will meet with your entire satisfaction, as we do in furnishing you with first quality supplies. What we understand by a good relaying rail is, that it must be straight, free from kinks, curves, laminations or battered ends, thirty foot lengths, with not over ten per cent. of shorter lengths. We also have the facilities for cutting rails to lengths specified by our customers. Write for our *Daily Rail* and *Equipment Bulletin*.

NOTES.

In order that one may readily determine what size rail will suit his requirements, we show track notes, statistics of number tons rail required per mile, etc. (See tables in back of catalogue.)

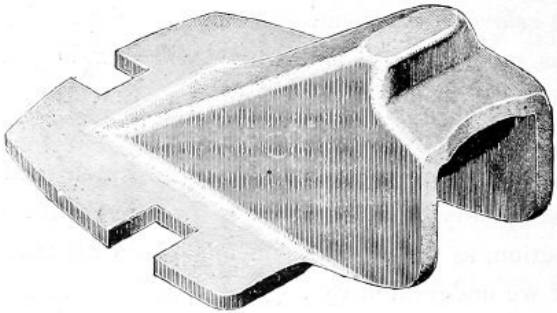
The adaptability of these light rail and their corresponding accessories is practically unlimited. They are used extensively in all mining industries, quarries, rolling mills, logging plants, saw mills, docks and warehouses, as well as for light portable railways. Also for cotton, coffee and sugar plantations, and tram roads for various purposes.

To facilitate quick deliveries and assure accuracy, standard lengths and accessories should be specified. Special lengths and special drilling or punching can be furnished when desired.

Send us your inquiries and if we happen to be without the rails you desire, we will try and secure them for you.

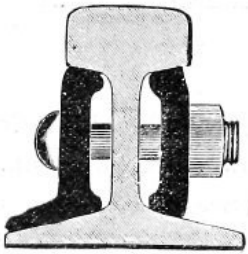
STEEL FORGED RAIL BRACES.

DESIGN No. 3.

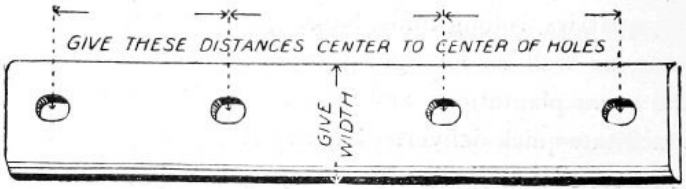


This brace is designed for rails up to 60 lb. per yard. It is made of ¼ inch steel and forged to fit any section up to weight mentioned.

ANGLE BARS.



FISH-PLATES.



Give size of holes.

We furnish rail splices, either fish plates or angle bars, to fit any size or make of rails. Send us template.

SWITCH STANDS.

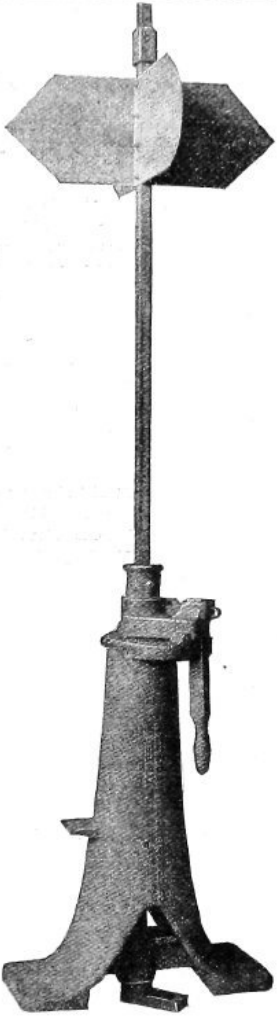
These illustrations show our regular stock patterns.

PLANTATION SWITCH STAND.

DESIGN No. 2.

PONY YARD SWITCH STAND.

DESIGN No. 5.



HIGH MAIN LINE SWITCH STAND.

DESIGN No. 6.

GROUND THROW SWITCH STAND.

DESIGN NO. 1.

All of the bearings and shafts are reamed and turned to secure a perfect fit of the parts
The weighted lever is provided with a handle grip that enables it to be easily thrown.
The connecting rod is forged from a solid bar without any welds.
This design of stand is intended for switches up to 35 pounds per yard.

GROUND THROW SWITCH STAND.

DESIGN NO. 3.

All of the bearings and shafts are reamed and turned to secure a perfect fit of the parts
The weighted lever is provided with a handle grip that enables it being easily thrown.
The connecting rod is forged from a solid bar without any welds.
This design of stand is intended for 40-pound switches and upwards.

AUTOMATIC GROUND THROW STAND.

DESIGN NO. 4

All the bearings are carefully drilled and reamed. The working parts are enclosed so that they are not affected by snow, ice, dirt or sand.

The crank shaft is in one piece, and die forged.

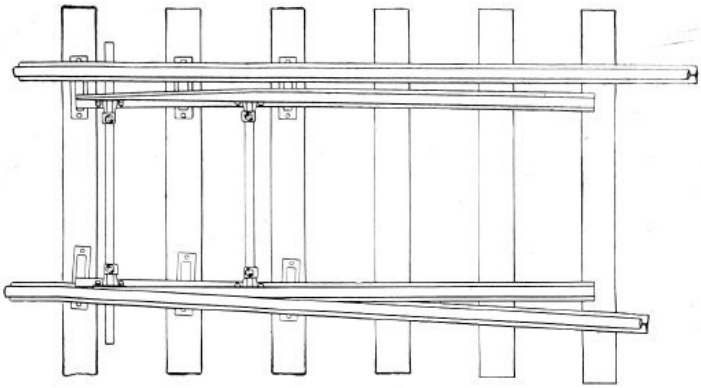
The lever throws parallel to the track, and is provided with a handle grip that enables it to be easily thrown.

The throwing gears are made of the best malleable iron, insuring great strength.

The connecting rod furnished with this stand is forged from the solid bar without any welds.

LIGHT-RAIL SPLIT SWITCH.

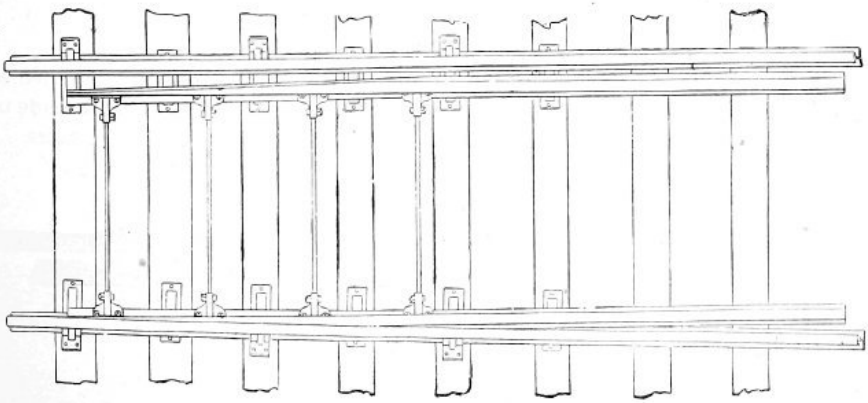
DESIGN No. 1.



This design shows our riveted plate frog for mines, furnaces and industrial works, using light rails from 12 lbs. per yard to 35 lbs. per yard.

SPLIT SWITCH.

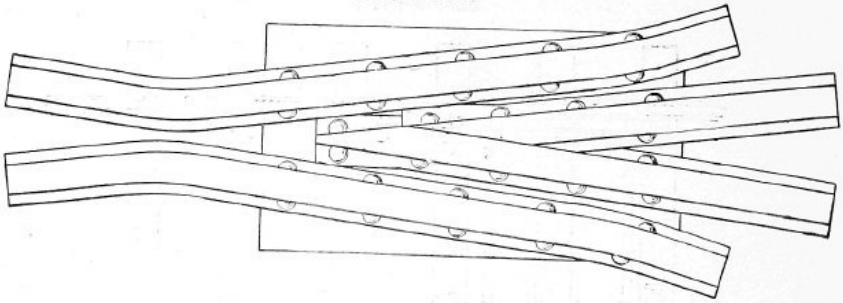
DESIGN No. 2.



Our design No. 2 illustrates our fifteen-foot switch.

LIGHT-RAIL FROG.

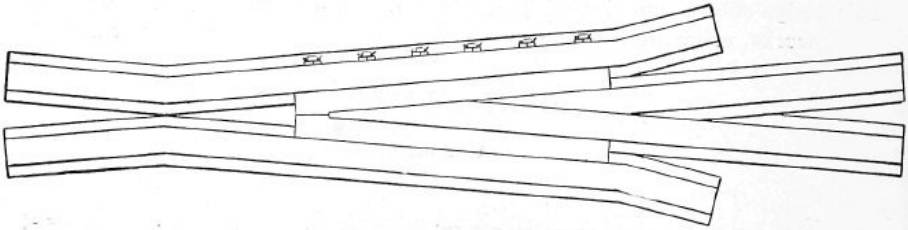
DESIGN No. 1.



This design shows our riveted plate frog for mines, furnaces and industrial works, using light rails from 12 lbs. per yard to 35 lbs. per yard.

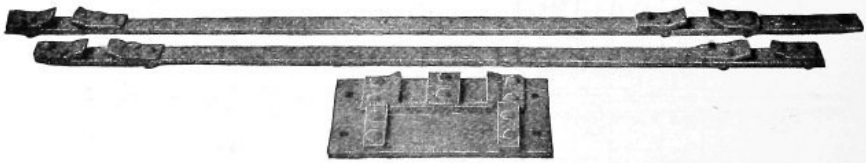
STANDARD STIFF FROG.

DESIGN No. 2.



We use solid steel filling, and as will be seen from section, it is rolled to accurately fit the rail section for which it is intended. The bolts are made of the best iron and furnished with hexagon nuts and fitted with steel cotters.

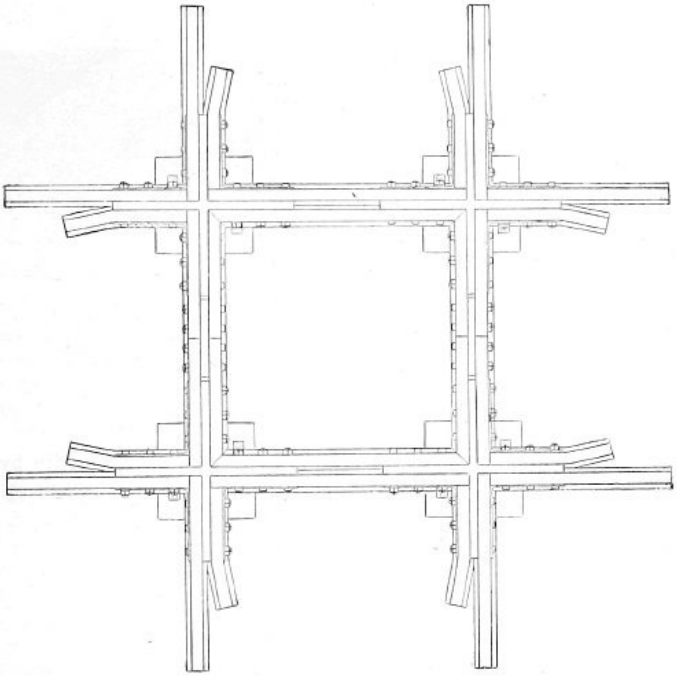
STUB SWITCH FIXTURES.



Illustrations show our riveted tie bars and single throw steel plate head chairs. These are made to fit any section of rail.

SOLID CROSSING 90°.

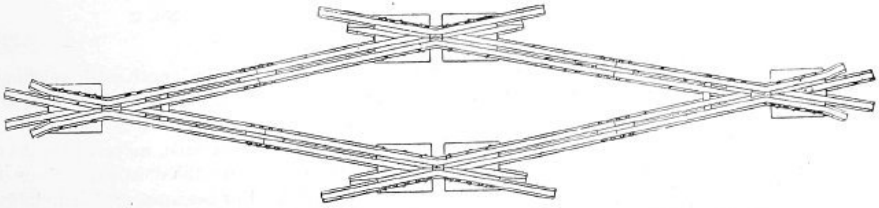
DESIGN No. 1.



Standard Steam Road Crossing.

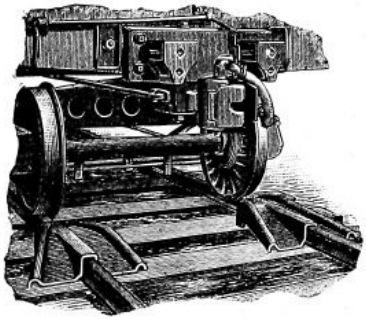
FROG CROSSING.

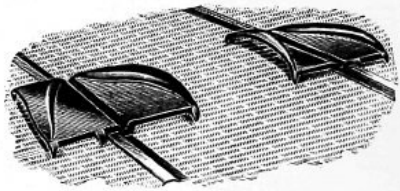
DESIGN No. 2.



This style of crossing is recommended for angles from 25 to 30 degrees.

PRITCHARD CAR REPLACERS.

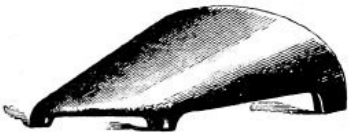




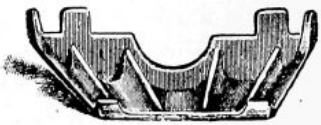
No. 1. Railroad for T rail, 70 lbs. and over.....$
No. 2. Interurban for T rail, 35 to 65 lbs.....
No. 3. Mine Size for T rail, 16 to 30 lbs.....
No. 4. Street Railroad for paved streets.....

In ordering, give size of rail either by end drawing of rail, or giving size by pound of rail, and make. State whether for steam or electric railway. If track is set on paved street, so state; whether girders, grooved or "T" rail.

F. & P. CAR REPLACERS.



No. 1.



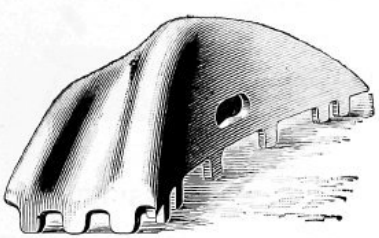
No. 2.

No. 1 shows the Replacer in its upright position, being 14 inches in length and weighing 23 to 24 lbs., being of a convenient size, whereby they are readily carried in the vestibule or beneath the seat.

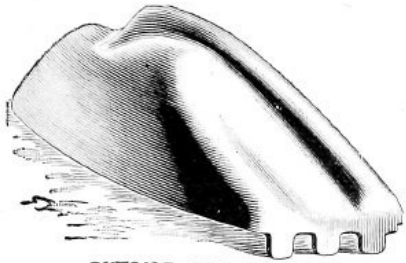
No. 2 shows lugs on under side, which prevent slipping on any surface, including asphalt and cobbles. They are made of the best quality malleable iron, moulded in the strongest possible manner, capable of supporting the heaviest of trucks. For seasons past a number of our customers have used them with success upon their snow plows.

The F. & P. Replacer is particularly well adapted for any street car lines.

ALEXANDER PRESSED STEEL CAR REPLACER.



INSIDE REPLACER.

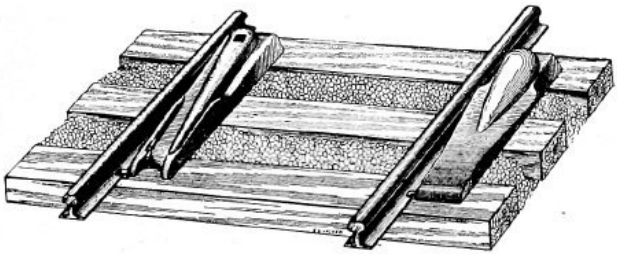


OUTSIDE REPLACER.

No. 1A Replacer, 150 lbs. per pair; high enough for 6 inch rail.....per pair $
No. 2A " 140 " " " " " " 5 " " ..... "
No. 3A " 50 " " " suitable for traction companies and mine engines, per pair.....

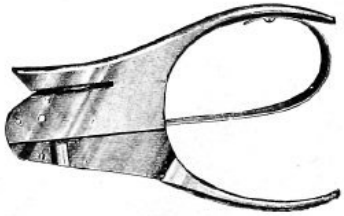
SNOW'S CAR AND LOCOMOTIVE REPLACERS.

For Steam and Electric Railroads.



No. 1S. Made of the best basic open hearth steel, fully guaranteed, weight 210 lbs. per pair, length 36 inches, suitable for the heaviest equipment and any height of rail..... $
No. 2S. Same exactly as No. 1, but made of air furnace malleable iron, and weighing 160 lbs. per pair.....
No. 3S. Made of air furnace malleable iron, weight 120 lbs. per pair, length 30 inches, suitable for traction companies and mine engines, etc.....

CONDUCTORS' AND TICKET PUNCHES.

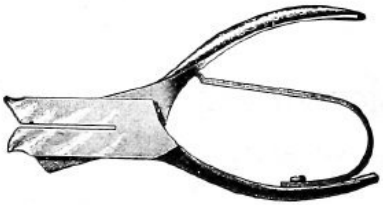


No. 1. CONDUCTORS' PUNCH.

Best Punch in use for any ticket, including thousand mile, commutation, duplex or similar forms. Each one handsomely nickel plated.
Single dies .....per doz., $24 00

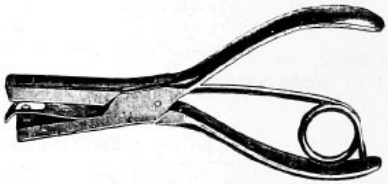
No. 16. CONDUCTORS' PUNCH.

A post pattern Punch of a cheaper construction, and is made with plain dies only. A well made and finely finished nickel plated Punch.
Price per doz.....$18 00



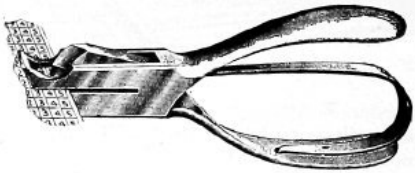
No. 8. PUNCH.

This Punch is one of the best cheap punches in the market, and very popular.
Nickel plated, price per doz., $16 00



No. 6½. TICKET PUNCH.

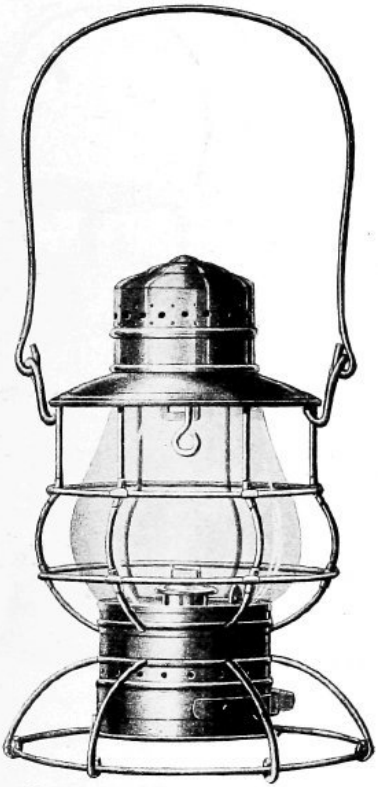
Polished.....price per doz., $7 00
Nickel plated.. " " 8 00



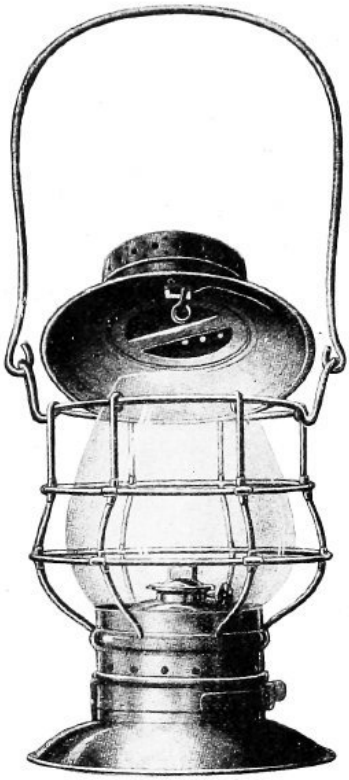
No. 33. TICKET PUNCH.

One of the best Punches made for punching Street Car Transfers and other Tickets, as the numbers to be punched can be plainly seen through the punch.
Price per doz.....$24 00

RAILROAD LANTERNS.



No. 39. WIRE BOTTOM LANTERN.



No. 39. TIN BOTTOM LANTERN.

Bail always in position to be grasped.
Can be dropped to bottom if desired.
Glass Oil Pots can be furnished.
Fitted with Bayonet Catch.
Burns Lard Oil or Railroad Signal Oil.
Can be fitted with Convex Burner to burn Kerosene.

Double guard, tin bottom ..... per doz., $12 00
" " wire " ..... " 12 50

Fitted with No. 1 or No. 1 extra tube burner.

FACTORY, MILL AND WAREHOUSE LANTERNS.

No. 0.

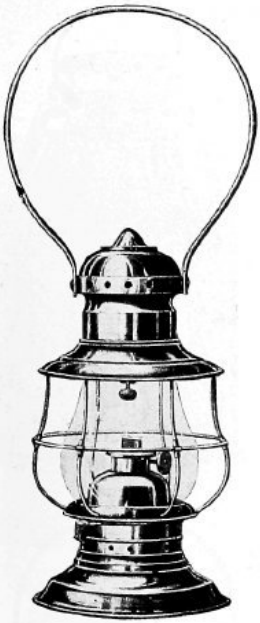
No. 2.

No. 2 S.S.S.

No. 0. Clipper Tin Tubular, with white globes.....per doz., $ 9 50
With ruby, green or blue globes ..... " 12 50
Fitted with No. 1 burner, 5/8 inch wick; packed 1 dozen in case.
Gross weight, 32 lbs.

No. 2. Cold Blast Tin Tubular, with white globes.....per doz., $16 00
With ruby, green or blue globes..... " 19 00
Fitted with No. 2 burner, 1 inch wick; packed in cases of ½ dozen each.
Gross weight, 25 lbs.

No. 2 S.S.S. Side Spring Safety, Mill Tin Tubular, with white glass, per doz..... $18 00
With bull's-eye globes, additional..... 50
Fitted with No. 2 burner, 1 inch wick; packed 1 dozen in case.
Gross weight, 46 lbs.



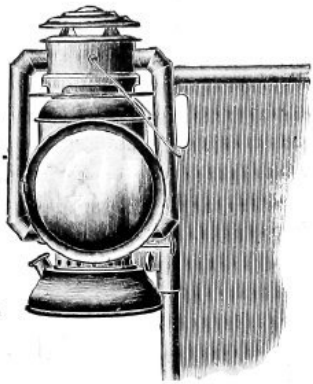
No. 3. CONDUCTORS'. Also known as "Pullman."

CONDUCTORS' LANTERN.

No. 3. Nickel plated.
Per doz.....$72 00
Engraving name on globe additional.
Each $1 00

UNION DRIVING LAMPS.

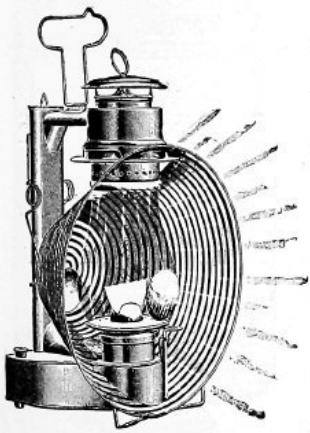
For either side or top of Dash.
20 candle power light.
Flint glass Lens.
Packed ½ dozen in case.
Gross weight, 70 lbs.
Japanned....doz., $42 00
Nickel plated, " 54 00



UNION DRIVING LAMPS.

No. 20. TUBULAR SEARCH LIGHT.

Japanned.
Bull's-eye Globe.
No. 2 Burner.
1 inch Wick.
12 inch Reflector, 7 inches deep.
Packed ½ dozen in case.
Gross weight, 50 lbs.
Price per doz.....$30 00



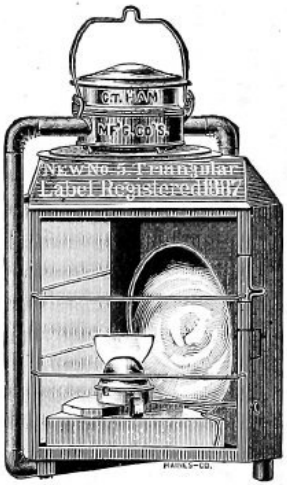
No. 20.

No. 15. TUBULAR DASH.

Clipper Lift, japanned.
Bull's-eye Globe.
No. 1 Burner.
⅝ inch Wick.
Packed in cases of ½ dozen each.
Gross weight, 27 lbs.
Price per doz.....$13 50

No. 15.

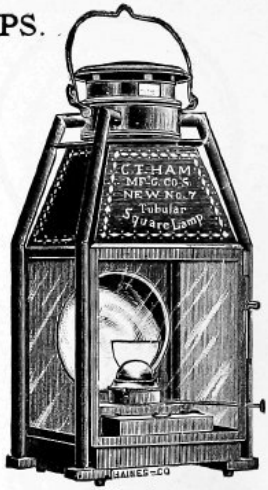
STREET AND STATION LAMPS.



No. 5.

No. 5.
STATION LAMP.

Triangular Tubular.
No. 5 Burner.
1½ inch Wick.
10 inch silvered glass Reflector.
Price each.....$8 50



No. 7.

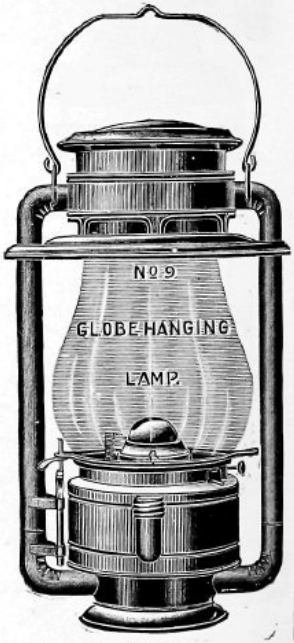
No. 7.
GOVERNMENT LAMP.

Square Tubular.
22½ inches high.
11¼ " wide.
10½ " deep
No. 7 Burner.
1½ inch Wick.
8 inch silvered glass Reflector.
Price each.....$8 50

No. 9.

No. 9.
GLOBE STREET LAMP.

No. 9 Burner.
1½ inch Wick.
Automatic Extinguisher, regulated to burn 4, 8, 12, 16, 20 and 24 hours.
Price each.....$6 00

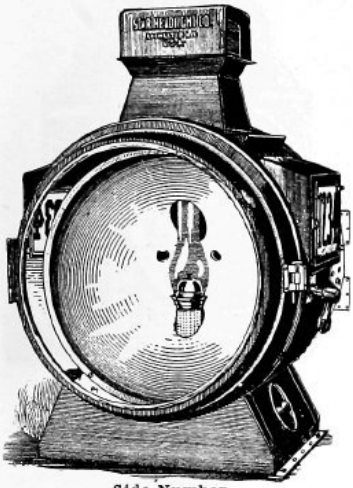


No. 9.

No. 9. GLOBE HANGING LAMP.

No. 9 Burner.
1½ inch Wick.
Automatic Extinguisher, regulated to burn 4, 8, 12, 16, 20 and 24 hours.
Price each.....$6 00

ALL STEEL "WABASH" HEADLIGHT.



Side Number.

Shows the ALL STEEL WABASH Headlight with side numbers and side doors. Interior may be withdrawn from side.

16-inch Headlight.

Extreme height, 30½ in.
Bottom, 19x13½ in.
Side Number Glass, 8¼x5 in.
Weight, net, 66 lbs.
" crated, 85 lbs.

Each.....$51 25

18-inch Headlight.

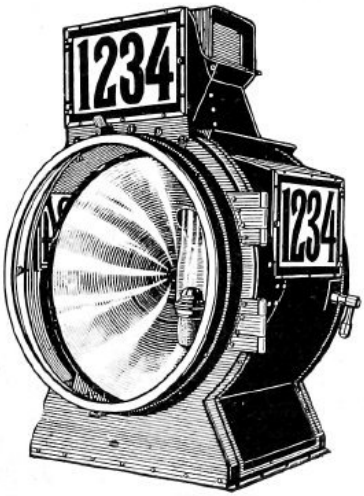
Extreme height, 34 in.
Bottom, 20x15 in.
Side Number Glass, 9½x5 in.
Weight, net, 72 lbs.
" crated, 100 lbs.

Each.....$53 75

FRONT AND SIDE NUMBER.

Shows the ALL STEEL WABASH Headlight with front and side numbers, both the same size, and front and side doors. Interior may be withdrawn from side. Notice how prominently the numbers are displayed by our system of illumination. "Kant be Beat." No dog house for a front number, either.

The case is circular style, and constructed of Nos. 14, 20, 21 and 22 gauge pickled and cold rolled Bessemer steel, reinforced with heavy band and angle iron, fastened with rivets spaced 1 inch apart.



16-inch Headlight.

Extreme height, 30½ in.
Bottom, 19x13½ in.
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Weight, net, 66 lbs.
" crated, 85 lbs.

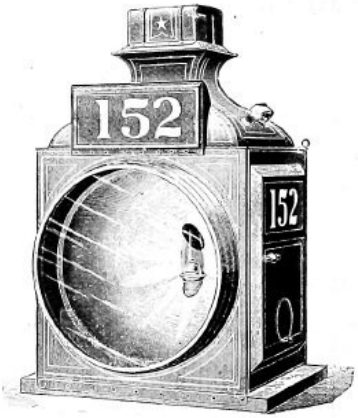
Each.....$52 50

18-inch Headlight.

Extreme height, 34 in.
Bottom, 20x15 in.
Side Number Glass, 9½x5 in.
Weight, net, 72 lbs.
" crated, 100 lbs.

Each.....$55 00

LOCOMOTIVE HEADLIGHTS.



Cases Made with Pressed Cold Rolled Bessemer Steel Panels.

Standard Square Front and Side Number.

23 inch	each,	$50 00
20 "	"	47 50
18 "	"	45 00
16 "	"	42 50
14 "	"	37 50
12 "	"	35 00
10 "	"	16 25

Standard Square Side Number.

23 inch	each,	$48 75
20 "	"	46 25
18 "	"	43 75
16 "	"	41 25
14 "	"	36 25
12 "	"	33 75
10 "	"	15 00

Standard Square Plain Case.

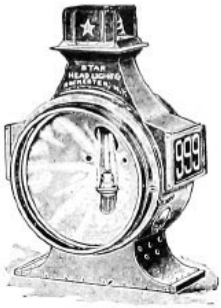
Plain Case.

23 inch	each,	$47 50
20 "	"	45 00
18 "	"	42 50
16 "	"	40 00
14 "	"	35 00
12 "	"	32 50
10 "	"	13 75

Approximate dimensions and weight of these three styles are as follows:

Height.	Bottom Board.	Weight Net.	Weight Crated.
42 in.	31 x20 in.	90 lbs.	120 lbs.
41 "	29¼ x18½ "	80 "	95 "
40 "	27¼ x17 "	70 "	90 "
36 "	25¾ x15¼ "	60 "	77 "
31 "	21¾ x13 "	40 "	50 "

The height of Headlights as given below may be shortened when necessary to meet the requirements of an especially short stack. Attention is called to the fact that little or no wood is used in the construction of our round Headlights.



Round Plain Case.

23 inch	each,	$48	15
20 "	"	45	65
18 "	"	43	15
16 "	"	40	65
14 "	"	35	65
12 "	"	33	15

Round Side Number.

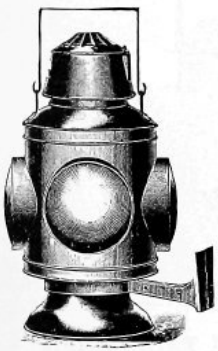
23 inch	each,	$49	40
20 "	"	46	40
18 "	"	44	40
16 "	"	41	90
14 "	"	36	90
12 "	"	34	40

DIMENSIONS AND WEIGHTS.

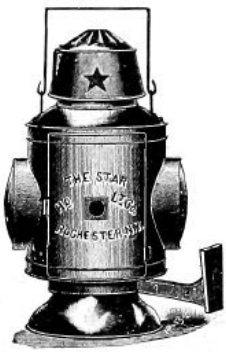
Size.	Height.	Length.	Depth.	Side Nos.	Net.	Crated.
12 inches.	24¾ inches.	16 inches.	5½ inches.		19 lbs.	26 lbs.
14 "	28 "	17½ "	6 "	5 x 6½ inches.	37 "	50 "
16 "	31 "	20½ "	8 "	5¾ x 7¾ "	48 "	60 "
18 "	31 "	22 "	10 "	6 x 9 "	50 "	75 "
20 "	33 "	21½ "	11¼ "	6 x10$^{3}/_{16}$ "	80 "	95 "
23 "	35 "	23¼ "	14¼ "	6 x11⅞ "	82 "	110 "

We equip our 12, 14, 16, 18, 20 and 23 inch Round Case Headlights with IRON slides and guides.

REAR AND SIDE SIGNAL LAMPS.



Right.



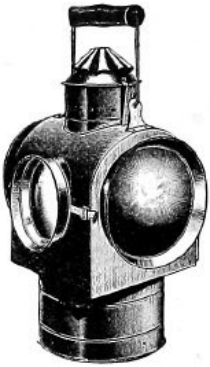
Left.

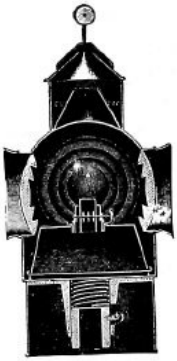
Fitted with 4 inch or 5⅜ inch inside Corrugated Semaphore Lenses; any color. These Lamps are used on rear and side of passenger trains. Each.....$5 25

SWITCH TARGET LAMP.

Each.....$7 25

SWITCH AND SIGNAL LAMPS.





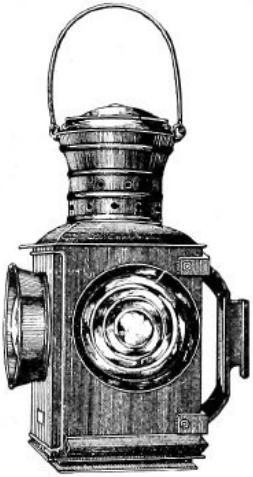
Sectional View.

SPRING BOTTOM SWITCH LAMP.

The patented spring device prevents the flame from going out from jar caused by passing trains.
Each.....$8 25

STAR TARGET LAMP.

With any size Semaphore Lens. Any color. Inside or outside corrugation.



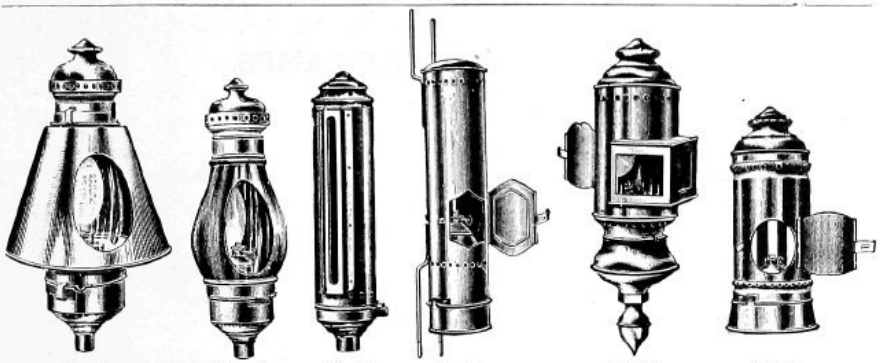
Two Lenses.

BLIZZARD ENGINE SIGNAL LAMP.

Has 4 inch white Semaphore Lenses, inside corrugation. Fitted with inside colored slides to change color of semaphore.
Each.....$4 80

PLATFORM TAIL LAMP.

With 8 inch Semaphore Lens. Fitted with high candle power. Kerosene or lard oil burner.
Each.....$12 00



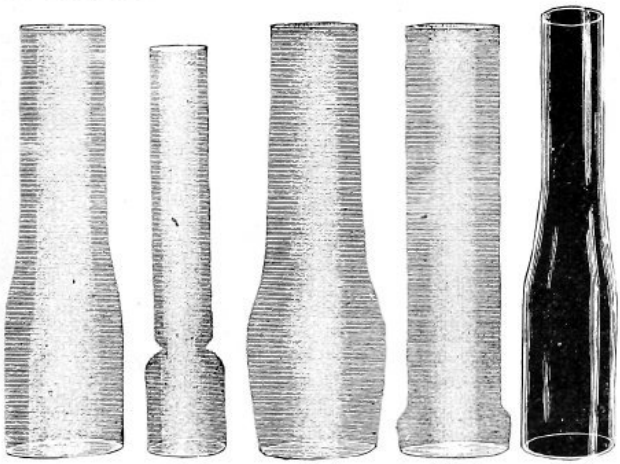
No. 1. No. 2. No. 3. No. 4. No. 5. No. 6.

No. 1.	Cab Lamp, with hood	each,	$5 00
No. 2.	" " " painted globe	"	2 50
No. 3.	Water Gauge Lamp	"	2 25
No. 4.	" " "	"	1 90
No. 5.	Cab Lamp	"	3 75
No. 6.	Lubricating Lamp	"	2 50

The above Lamps are brass, and are very substantially made.

HEADLIGHT CHIMNEYS.

No. 2Z.



No. 1. No. 2. No. 3. No. 4. No. 5.

No. 2Z. Zelnicker Headlight Chimney, pure lead glass, oil finish.
No. 1. Star Headlight Co.'s Standard Chimney, fits all sizes of headlights from 14 to 23 inches.
No. 2. Standard Chimney, for cable or motor car headlights.
No. 3. " " " hall burner.
No. 4. " Ft. Wayne Chimney.
No. 5. Mochring Argand.

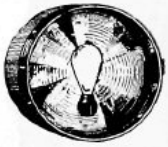
STREET RAILWAY LAMPS.

8 or 10 Inch Electric Headlight.

Attached to hood of car.

Furnished with heavy tin, steel or brass case.

8 inch complete.....each, $6 25
10 " " ..... " 7 50



8 or 10 Inch Electric Headlight.

Attached to dasher of car.

Furnished with heavy tin, steel or iron case.

8 inch complete.....each, $6 25
10 " " ..... " 7 50

10 Inch Square Headlight.

Specially constructed with dashboard attachment for Cable or Motor Cars.

Extreme height, 21 inches; bottom board, 13x7 inches.

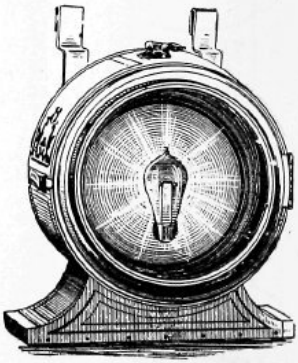
Fitted with Mochring, Argand or Student Burner.

Each.....$13 75

8 Inch Small Electric Headlight.

To hang on dashboard of Electric Motor Cars, Automobiles and Electric Fire Engines.

Complete....each, $6 25



10 Inch Electric Headlight.

For dash of Electric Motor Cars. Case made of heavy tin, and reflector copper, heavily plated with silver.

Complete.....each, $7 50

Nos. 505 and 606.

"NEVER BREAK" MICA HEADLIGHT CHIMNEYS AND LANTERN GLOBES.

HEADLIGHT CHIMNEYS.

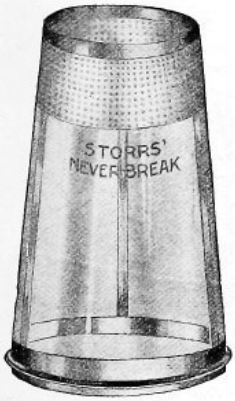
As clear as glass and many times more durable.

Mica Lantern Globes cannot break from tipping the lantern, turning up light, cold, wind, rain or sleet, dropping lantern, or jarring it. The Mica Globe weighs about one-fifth as much as a glass globe.

No breakage in transit.

STANDARD SIZES.

Nos. 606 and 660.	2¼ inch bottom diameter	per doz.,	$3 75
Nos. 505 " 550.	2½ " " "	"	3 75
Nos. 303 " 330.	2¼ " " "	"	3 50



No. 39. For Railroad Lantern.

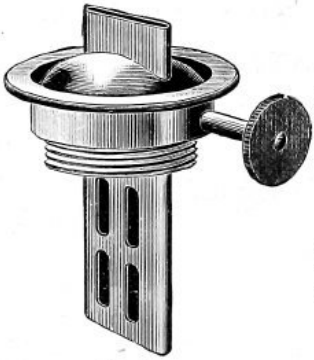
LANTERN GLOBES.

Made to fit any size railroad lantern. Are made in White, Ruby, Green, Blue, Green and White.

PRICES, ALL SIZES.

White	per doz.,	$4 50
Colored	"	6 00

RAILROAD LANTERN BURNERS.



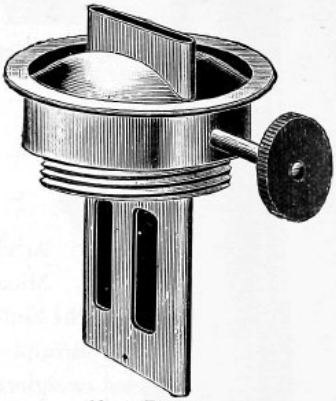
No. 1.

No. 1 Ratchet Burner, ⅝ inch "A" Wick, Sperm Oil.

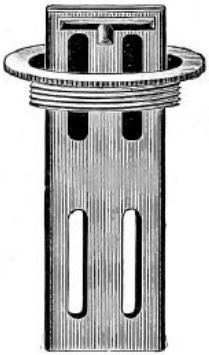
Per doz.....$0 75

No. 1 Extra Ratchet Burner, 1 inch "B" Wick, Sperm Oil.

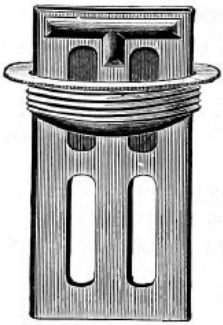
Per doz.....$1 00



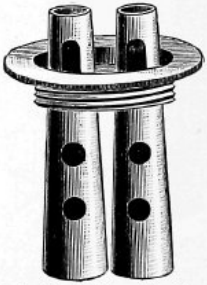
No. 1 Extra.



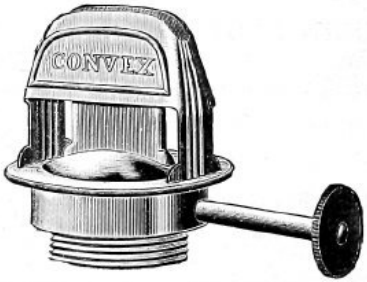
No. 1 Flat Copper Burner, ⅝ inch "A" Wick, Sperm Oil.
Per doz.....$0 50



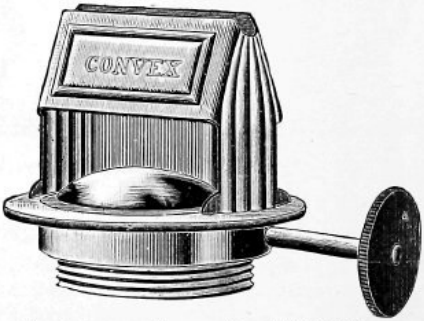
No. 1 Extra Flat Copper Burner, 1 inch "B" Wick, Sperm Oil.
Per doz.....$0 75



No. 1 Two Tube Tin Burner, Sperm Oil.
Per doz.....$0 35



No. 1 Convex Burner, ⅝ inch "A" Wick, Kerosene.....per doz., $1 00



No. 2 Convex Burner, 1 inch "B" Wick, Kerosene.....per doz., $1 50

No. 3. MAMMOTH BANNER FOUNT AND HARP.

Can be lighted without removing chimney.

No. 1167.

With 20 inch Tin Reflector.

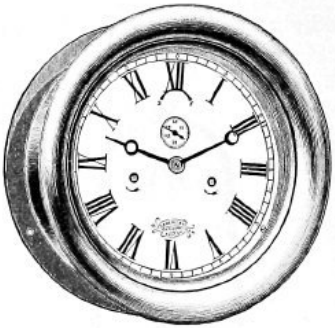
1 dozen Founts, Harps and Smoke Bells only, packed in a case. Measures 10 cubic feet. Weight, 103 lbs. gross, 61 lbs. net.

Complete as above, brass.....each, $5 00

The above are also packed 1 in a case complete as per cut, ready for shipment.

AMERICAN MARINE AND LOCOMOTIVE CLOCKS.

EIGHT DAY.



These clocks are made with a ring hinged to the case, fitted with lock and key, and finished in the highest manner, having chronometer balance, full jeweled in the escapement, and patent regulator. They are designed especially for stationary plants, marine engines, locomotives, yachts, etc., and, in fact, all places where pendulum clocks can not be used, and yet accurate time is required.

PRICES.

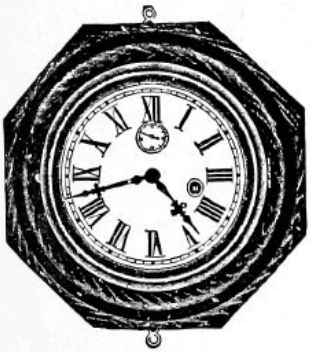
Size.	Movement.	Time.	Brass Case.	N. P. Case, O. G. or Oct. Ring.
12 inch dial	Howard,	8 day,	$110 00	$114 00
10 "	"	"	90 00	93 00
8½ "	"	"	80 00	82 50
6¾ "	"	"	70 00	72 00
12 "	Seth Thomas,	"	90 00	94 00
10 "	"	"	65 00	68 00
8½ "	"	"	55 00	57 50
6¾ "	"	"	45 00	47 00
12 "	Boston,	"	90 00	94 00
10 "	"	"	65 00	68 00
8½ "	"	"	55 00	57 50
6¾ "	"	"	45 00	47 00
6 "	"	"	40 00	41 50
5½ "	"	"	38 00	39 25
5 "	"	"	35 00	36 00

YANKEE CLOCKS.

EIGHT DAY.

6¾ inch,	brass case	net $16 00
6¾ "	nickel plated case	" 17 00
8½ "	brass case	" 20 00
8½ "	nickel plated case	" 21 00

CLOCKS.



LEVER.

LEVER.

Oak or Walnut.

1 day, 4 inch, time	$2 30
1 " 6 " "	3 25
1 " 6 " strike	4 00
1 " 8 " time	3 75
1 " 8 " strike	4 50
8 " 6 " time	4 35
8 " 8 " "	4 75
8 " 8 " strike	6 75

OCTAGON LEVER.

Veneered.

1 day, 6 inch, time	$3 25
1 " 6 " strike	4 00
1 " 8 " time	3 75
1 " 8 " strike	4 50
8 " 6 " time	4 35
8 " 8 " "	4 75
8 " 8 " strike	6 75
8 " 10 " time	5 45
8 " 12 " strike	8 15

4 inch measures across the back 6¼ inches.
6 " " " " " 8⅞ "
8 " " " " " 10¾ "
12 " " " " " 15⅛ "

OCTAGON LEVER.

8 inch DROP OCTAGON.

DROP OCTAGON.

Oak or Veneered.

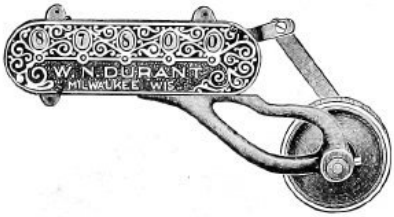
8 inch dial. Height, 19 inches.

8 day, time	$5 00
8 " half-hour strike	6 00
Alarm, additional	50
8 day, time, calendar	5 50
8 " half-hour strike, calendar	6 50

TALLY WITHOUT ATTACHMENTS.

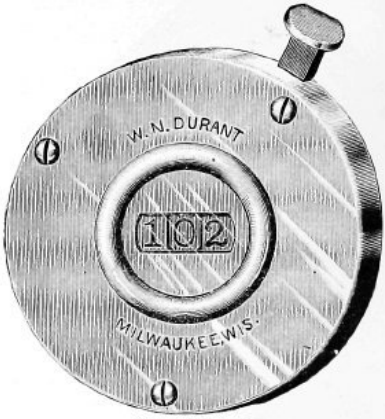
No. 1. Four dials, registering 10,000..$ 8 00
No. 2. Five " " 100,000.. 10 00

LINEAL MEASURE COUNTER.



No. 1. Four dials, registering 10,000..$18 00
No. 2. Five " " 100,000.. 20 00

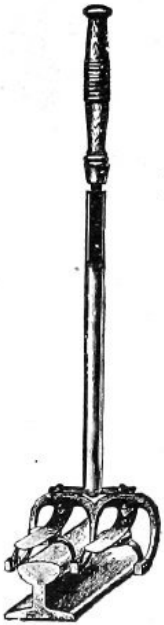
HAND TALLY.



Cut Full Size.

Price, net.....$3 00

TORPEDO ADJUSTER.



Price, each..$3 50

FUSEES OR TORCHES.

For preventing rear end collisions. Wind, snow or rain will not affect them. Displays a brilliant red light for 5, 10 or 15 minutes. Perfectly safe to handle, as they can only be lighted by the chemical surface provided on each torch.

Price, 5 minute.....per gro., $15 00
" 10 " ..... " 17 50
" 15 " ..... " 20 00

BUNTING.

Railway Bunting, red, white, blue and green.....per piece, $4 50
Army " " " " " " ..... " 5 00
Navy " " " " " " ..... " 5 50
Standard " " " " " " ..... " 6 00

SIGNAL FLAGS.

Any color, 18x20 inches.....per doz., $1 50
" " 18x24 " ..... " 1 75

TORPEDOES.

Patent Steel Spring Torpedo.

Price.. per gross, $4 00

Patent Cannon Granite Lead Strap Torpedo.

The gritty, or granite, covering of this Torpedo prevents the wheel from shoving it along, or from, the rail, and renders explosion *absolutely* certain under all circumstances.

Price.. per gross, $3 00

Patent Three-Strap Torpedo. Price.................per gross, $3 50

Wedge Shape Torpedo. Price.................per gross, $1 75

	No. 1. Lead Clasps.	No. 2. Lead Clasps.	No. 3. Tin Clasps.
Railroad.........per gross,	$1 25	$1 75	$1 75

WICKS.

Flat.

No. 0 or E, Kerosene;	width, ⅝ inch;	length, 8 inches	per gross,	$0 50
" 1 " A,	" ⅞ "	" 8 "	"	70
" 2 " B,	" 1 "	" 8 "	"	1 00
" 3 " D,	" 1½ "	" 8 "	"	1 60
" 3 " D, Dual;	" 1⅛ "	" 9 "	"	3 00
Duplex and Oxford;	" 1⅜ "	" 10 "	"	3 00

Argand.

No. 3 or D, Moehring, Flat; width, 2¾ in.; length, 8 in.	per gross,	$3 00
" 3 " D, " Round; length, 6 inches	"	2 75
" 3 " D, " " " 8 "	"	3 25
" 1 and 2, German Student; inside diameter, ⅜ inch; length, 4½ inches	"	1 10

Head Light.

Gensch's Felt, Small;	width, 1⅞ inch;	length, 5 inches	per gross,	$25 00
" " Large,	" 1⅜ "	" 5¾ "	"	30 00
Common "	" 1⅓ "	" 6¼ "	"	6 00

Candle Wick.

Best	per lb.,	$0 15
No. 2	"	12

LAMP TRIMMERS.

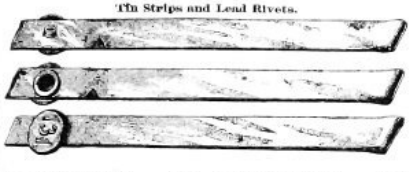
Price.. per doz. $4 00

CAR SEALS.

Leads and Wires.

Per 1,000 .... $2 25

Tin Strips and Lead Rivets.



Per 1,000, 10 inches long..........$2 50   Per 1,000, 8 inches long..........$2 25

Discount..................

SEALING PRESSES.

Price.. each, $2 50

" Engraved.. " 8 50

CAR WHEEL CIRCUMFERENCE GAUGES.

Master Car-Builders' Standard.

These Gauges are made of flexible tempered steel, with convenient adjustable handles, and are graduated to obtain accurately, by circumference measurement, the standard diameters of car wheels, from 24 to 42 inches, at the proper distance from the inside of the flange, as adopted by the Master Car-Builders' Association.

The Gauges are graduated to indicate variations of size by sixteenths of an inch in terms of the diameter, above and below for each regular size included, and will be found well adapted for the purpose for which they are designed.

Price, Steel.. $25 00

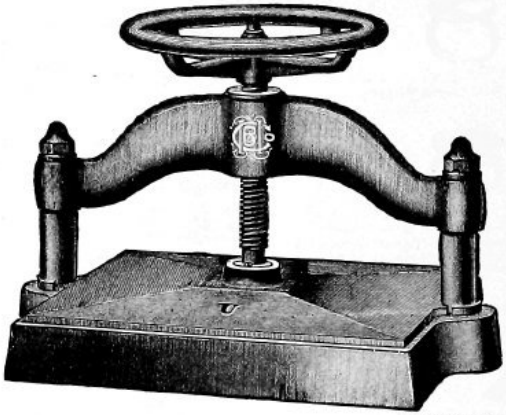
ADJUSTABLE TIRE SHRINKAGE GAUGE.

By the use of this Gauge the boring of locomotive tires can be accurately done and with proper shrinkage to any desired allowance. It is so arranged that wear on the points is entirely overcome; there is no wear on the measuring pieces, they being hardened and ground to micrometer measurements. It is made to conform to the Master Mechanics' Standard of Sizes and Shrinkages, as adopted by them in June, 1886.

Price, for Tires 30 inches to 50 inches, inside diameter.......... $40 00

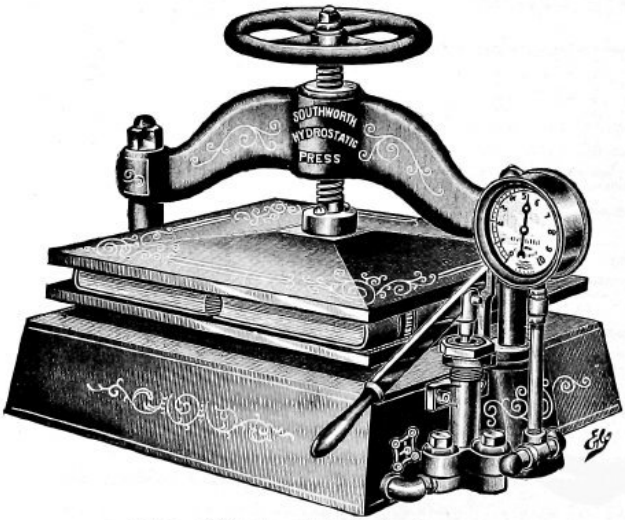
" " " 50 " 70 " " 50 00

COPYING PRESSES.



		Finished in Plain Black.	Finished in Black and Bronze.
Size of follower, 15x20	price,	$18 00	$19 50
" " 16x20	"	20 00	21 50
" " 18x22	"	23 00	25 00
" " 20x30	"	65 00	70 00

HYDROSTATIC COPYING PRESS.

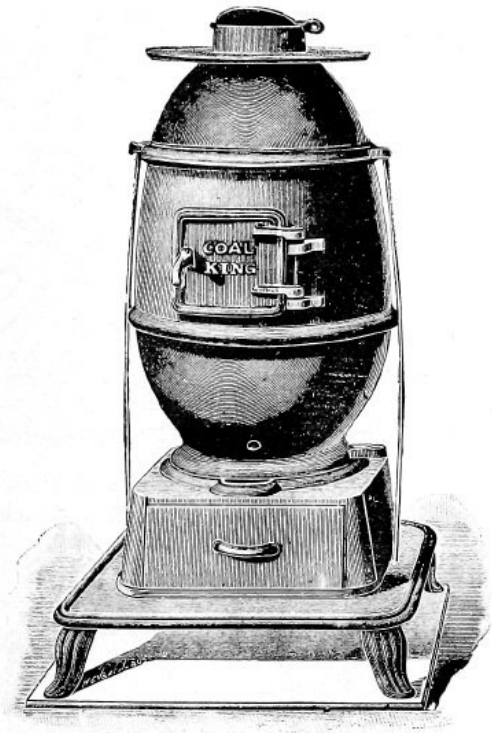


Size of Platen, 18x22 inches.

This machine has a capacity of ten tons pressure, which is quickly and easily applied by operating the lever. The platen is raised or lowered to suit the thickness of the book by turning the wheel at the top. The pressure can be instantly relieved by slightly turning the small wheel at the right of the base. The whole machine is very strong, massive and durable. Directions for operating are furnished with each press.

Price.....$90 00

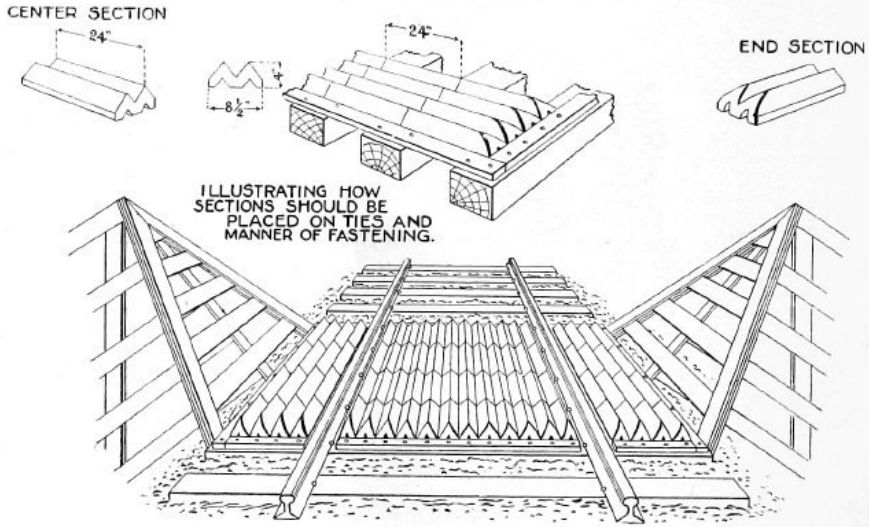
COAL KING STOVES.



You will observe that the "Coal King" is a very heavy stove. It is durable and will last five times longer than the light common cannon stoves now on the market.

No. 3.	14½ inch fire bowl, weight 265 lbs	each,	$15 00
No. 4.	16½ " " " " 330 "	"	18 00
No. 5.	18 " " " " 430 "	"	21 00

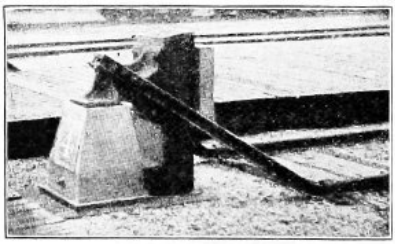
THE CLIMAX CATTLE GUARD



Manufactured from shale clay, burned hard and vitrified, and it is not affected in any way by weather conditions or climatic changes. Barring accidents, it will last forever.

Write for particulars and prices.

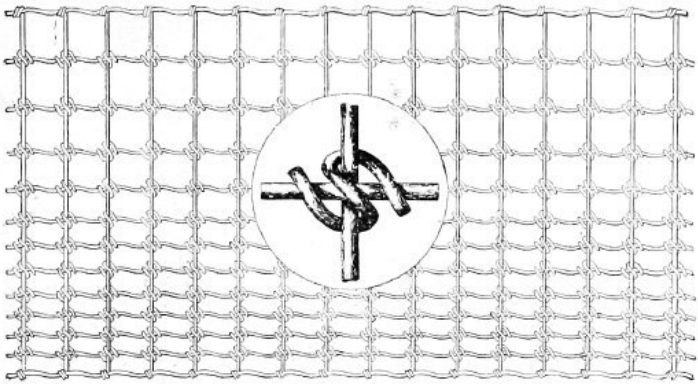
THE ELLIS PATENT BUMPING POST.



STANDARD FREIGHT POST.

Write for circulars and prices.

WIRE FENCING.



Style No. 618.—For hedges. Medium-spaced cross bar. Top and bottom, No. 11; intermediate laterals, No. 12; twenty-one No. 12 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 18 inches high, weighs 5 lbs. per rod.....price per rod, $0 35

Style No. 726, Special Hog Fence.—Top and bottom, No. 9; intermediate laterals, No. 12; twenty-eight No. 11 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 26 inches high, weighs 8.2 lbs. per rod.....price per rod, 55

Style No. 936, Hog and Sheep Fence.—Top and bottom, No. 9; intermediate laterals, No. 12; fourteen No. 11 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 36 inches high, weighs 7.9 lbs. per rod.....price per rod, 54

Style No. 950, Cattle Fence.—Top, No. 7; bottom, No. 9; intermediate laterals, No. 11; fourteen No. 11 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 50 inches high, weighs 10 lbs. per rod.....price per rod, 67

Style No. 1054, Field Fence.—Top, No. 7; bottom No. 9; intermediate laterals, No. 11; fourteen No. 11 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 54 inches high, weighs 10.9 lbs. per rod.....price per rod, 73

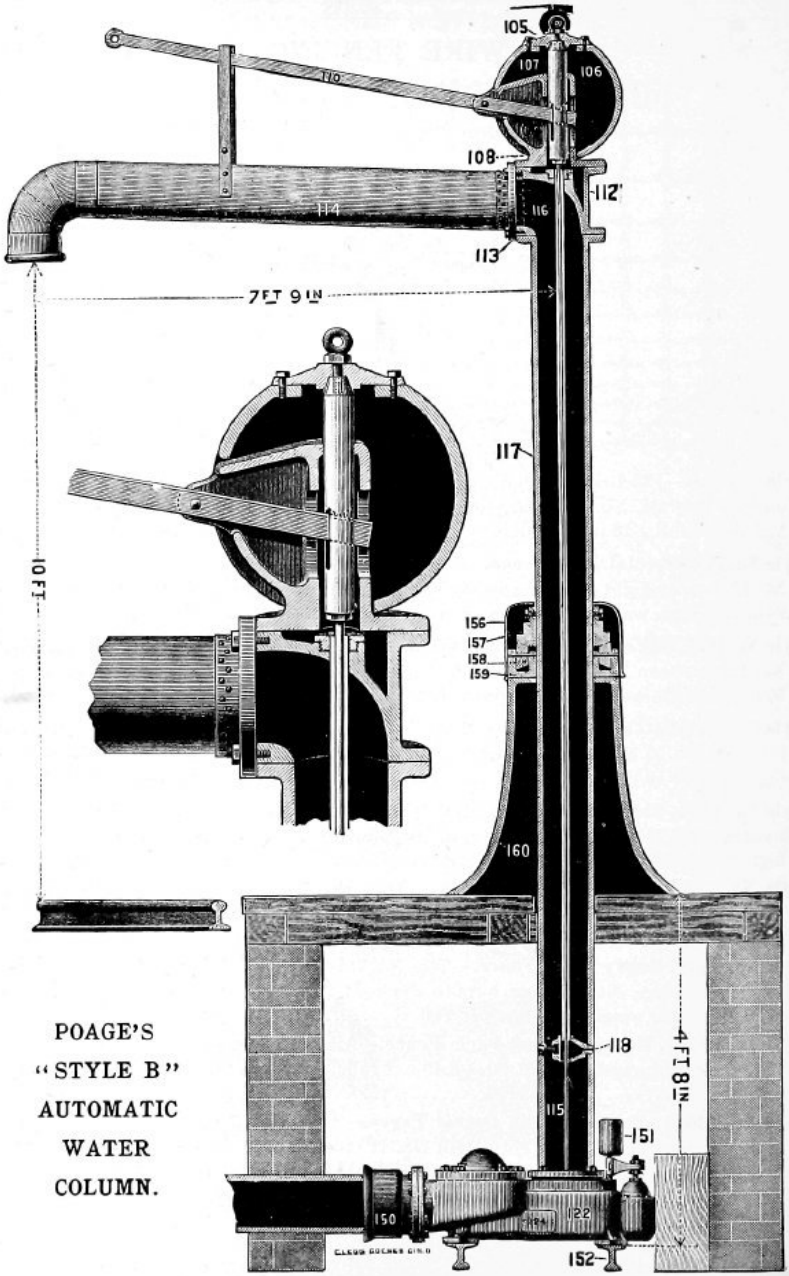
Style No. 1158, Standard Farm Fence.—Top, No. 7; bottom, No. 9; intermediate laterals, No. 11; fourteen No. 11 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 60 inches high, weighs 11.8 lbs. per rod.....price per rod, 80

Style No. 1358, Heavy Farm Fence.—Top, No. 7; bottom, No. 9; intermediate laterals, No. 11; fourteen No. 11 cross bars to the rod; furnished in 20, 30 and 40 rod rolls; 57 inches high, weighs 13.3 lbs. per rod.....price per rod, 90

Style No. 10541, Heavy General Farm Fence.—All No. 9 laterals, all No. 9 cross bars, 11 to the rod; furnished in 20, 30 and 40 rod rolls; 58 inches high, weighs 13.8 lbs. per rod.....price per rod, 91

Style No. 13581, Barnyard and Corral Fence.—Top, No. 7; bottom, No. 9; intermediate laterals, No. 11; twenty-eight No. 11 cross bars to the rod; furnished in 10, 20, 30 and 40 rod rolls; 58 inches high, weighs 17.2 lbs. per rod.....price per rod, 1 18

FENCE SHIPPED IN FULL ROLLS ONLY.



POAGE'S "STYLE B" AUTOMATIC WATER COLUMN.

POAGE'S
"STYLE B" AUTOMATIC WATER COLUMN.

Description

The "Poage" Water Columns are made of the best material throughout, the various parts being made of iron, steel and gun metal. Every part, from the smallest to the largest, is given close inspection as to quality of material and workmanship before entering the assembling department. For these reasons the repairs required are reduced to a minimum, and the mechanism requires but little attention. Every part is interchangeable and can be replaced from our factory at any time on short notice.

No Retardation

The flow of water through the column from the mains is direct and there is no hindrance whatever to the full stream of water passing through the column. Capacity of chambers is increased to avoid retardation of flow.

Simplicity

The taking of water is very simple, all being done by one man without leaving the tender. The fireman draws the spout around to position for taking water, pulls down lever (No. 110) and the flow is immediate.

Automatic

The lever can be fastened down under the pin in the guide for that purpose, and when sufficient water has been taken, the lever is easily released from under this pin. The mechanism will do the rest. No part of the action of our column is controlled by *springs, as they are not reliable.* It is operated entirely by gravity.

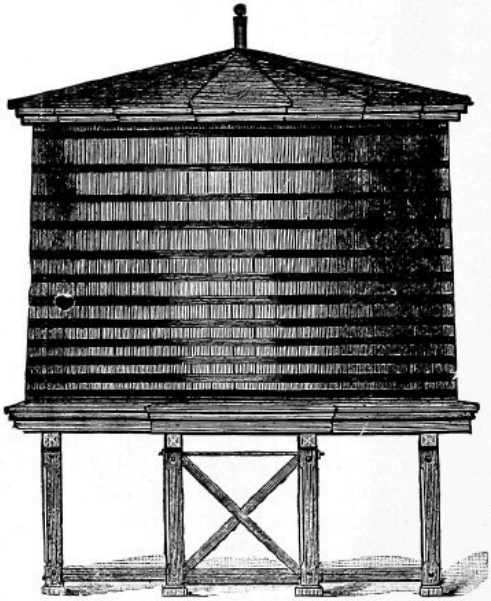
Safety

The spout being released, will return to its position (by gravity) away from and parallel to the track, and remain in that position. Its action is positive; never forgets; no locking required. It can not swing over the track alone, nor can the lever be operated while the spout is parallel to track. The advantages of these features are obvious. The wind can not blow the spout across the track to cause accident, nor can mischievous boys turn on the water.

For 12 inch, without adjustable spout	$326 00
" 10 "	230 00
" 8 "	200 00
" 6 "	184 00

For extra length vertical pipe or spout, additional charge will be made.

CYPRESS TANKS.



On the following pages we give Lists on Round Tanks, regular stock sizes, which we are prepared to furnish promptly.

Write for Discounts and Delivered Prices.

ROUND TANKS FOR ALL PURPOSES

Gallons.	Inside Diameter.	Inside Depth.	No. of Hoops.	Shipping Weight.	Price Complete, Riveted Hoops.	Price of Lugs, Extra.	Gallons.	Inside Diameter.	Inside Depth.	No. of Hoops.	Shipping Weight.	Price Complete, Riveted Hoops.	Price of Lugs, Extra.
	ft. in.	ft. in.		lbs.				ft. in.	ft. in.		lbs.		
158	3.0	3.0	3	220	$10 00	$2 40	1127	8.0	3.0	3	754	$24 20	$2 65
180	3.0	3.5	4	256	11 00	2 69	1294	8.0	3.5	4	840	27 00	3 45
216	3.6	3.0	4	277	12 00	2 69	1500	8.0	4.0	5	931	30 05	4 50
240	3.6	3.5	4	303	13 00	2 69	1656	8.0	4.5	5	989	31 85	4 50
321	4.0	3.5	4	361	15 20	2 69	2031	8.0	5.5	5	1096	35 50	4 50
406	4.6	3.5	4	402	16 55	2 69	2406	8.0	6.5	6	1248	40 15	5 80
587	5.0	4.0	4	505	18 50	2 86	2781	8.0	7.5	6	1372	44 05	5 55
648	5.0	4.5	4	543	20 55	2 86	637	8.6	1.5	2	615	19 65	1 85
712	5.6	4.0	4	566	21 90	3 20	849	8.6	2.0	2	675	21 50	1 85
788	5.6	4.5	5	624	23 00	4 00	1061	8.6	2.5	3	765	24 50	2 65
964	5.6	5.5	5	706	26 00	4 00	1273	8.6	3.0	3	825	26 40	2 65
317	6.0	1.5	2	363	15 00	1 60	1450	8.6	3.5	4	915	28 25	3 45
422	6.0	2.0	2	411	16 00	1 80	1697	8.6	4.0	4	982	31 50	3 70
527	6.0	2.5	3	476	18 00	2 65	1875	8.6	4.5	4	1038	32 05	3 70
632	6.0	3.0	3	520	20 50	2 65	2299	8.6	5.5	5	1190	38 20	4 50
720	6.0	3.5	4	586	22 50	3 45	2723	8.6	6.5	5	1314	42 10	4 75
845	6.0	4.0	5	645	24 00	4 00	3148	8.6	7.5	6	1462	46 90	5 55
934	6.0	4.5	4	694	25 50	4 00	3572	8.6	8.5	7	1616	51 90	6 35
1145	6.0	5.5	5	776	28 00	4 25	714	9.0	1.5	2	656	20 95	1 85
372	6.6	1.5	2	419	16 25	1 60	951	9.0	2.0	3	740	23 70	2 40
495	6.6	2.0	3	487	18 00	2 40	1188	9.0	2.5	3	804	25 70	2 40
618	6.6	2.5	3	535	19 75	2 40	1425	9.0	3.0	4	907	29 25	3 45
741	6.6	3.0	3	583	21 25	2 40	1623	9.0	3.5	4	971	31 20	3 45
848	6.6	3.5	4	656	23 00	3 20	1900	9.0	4.0	4	1035	33 20	3 45
993	6.6	4.0	5	729	25 50	4 00	2098	9.0	4.5	4	1104	35 35	3 70
1096	6.6	4.5	4	778	27 60	4 25	2577	9.0	5.5	5	1260	40 40	4 50
1344	6.6	5.5	5	906	29 00	4 25	3053	9.0	6.5	5	1394	44 65	4 75
1592	6.6	6.5	6	1010	33 15	5 05	3529	9.0	7.5	6	1553	49 80	5 55
431	7.0	1.5	2	446	17 00	1 60	4004	9.0	8.5	7	1711	54 95	6 35
575	7.0	2.0	2	496	18 25	1 60	795	9.6	1.5	2	726	23 15	1 85
719	7.0	2.5	3	570	19 75	2 40	1060	9.6	2.0	3	821	26 30	2 40
863	7.0	3.0	3	620	21 50	2 40	1320	9.6	2.5	3	889	28 40	2 40
983	7.0	3.5	4	694	23 50	3 20	1590	9.6	3.0	3	964	30 80	2 65
1151	7.0	4.0	4	751	25 25	3 45	1811	9.6	3.5	4	1066	34 20	3 45
1271	7.0	4.5	4	801	27 50	3 45	2120	9.6	4.0	4	1134	36 30	3 45
1559	7.0	5.5	5	921	30 00	4 25	2348	9.6	4.5	4	1223	39 15	3 70
1847	7.0	6.5	5	1031	34 50	4 50	2871	9.6	5.5	5	1385	44 45	4 75
495	7.6	1.5	2	509	18 00	1 60	3402	9.6	6.5	6	1554	49 95	5 55
660	7.6	2.0	3	589	19 75	2 40	3933	9.6	7.5	6	1690	54 20	5 75
825	7.6	2.5	3	643	21 00	2 40	4462	9.6	8.5	7	1859	59 70	6 35
990	7.6	3.0	3	697	22 50	2 40	4992	9.6	9.5	7	2002	64 25	6 60
1128	7.6	3.5	4	778	25 00	3 20	881	10.0	1.5	2	765	24 40	1 85
1322	7.6	4.0	4	833	30 15	3 45	1175	10.0	2.0	2	837	26 65	1 85
1460	7.6	4.5	4	893	31 50	3 45	1468	10.0	2.5	3	945	30 25	2 65
1790	7.6	5.5	5	1032	35 55	4 50	1762	10.0	3.0	3	1017	32 25	2 65
2120	7.6	6.5	5	1140	37 60	4 50	2006	10.0	3.5	4	1124	36 05	3 45
563	8.0	1.5	2	552	17 65	1 85	2348	10.0	4.0	4	1202	38 50	3 70
751	8.0	2.0	2	610	19 45	1 85	2592	10.0	4.5	4	1274	40 75	3 70
939	8.0	2.5	3	689	22 05	2 40							

The above prices are based upon tanks made of 2 inch material; for 2½ inch material add 40 per cent. to list; for 3 inch material add 60 per cent. to list; for weight of 2½ inch add 35 per cent. to list; for weight of 3 inch add 70 per cent. to list.

ROUND TANKS FOR ALL PURPOSES

Gallons.	Inside Diameter.	Inside Depth.	No. of Hoops.	Shipping Weight.	Price Complete, Riveted Hoops.	Price of Lugs, Extra.	Gallons.	Inside Diameter.	Inside Depth.	No. of Hoops.	Shipping Weight.	Price Complete, Riveted Hoops.	Price of Lugs, Extra.
	ft. in.	ft. in.		lbs.				ft. in.	ft. in.		lbs.		
3182	10.0	5.5	5	1454	$46 60	$4 50	2115	12.0	2 5	3	1226	$39 15	$ 2 65
3770	10.0	6.5	5	1608	51 50	4 75	2538	12.0	3.0	3	1318	42 05	2 90
4357	10.0	7.5	6	1784	57 20	5 55	2891	12.0	3.5	3	1414	45 10	3 15
4945	10.0	8.5	7	1971	63 30	6 60	3384	12.0	4.0	4	1534	49 10	3 70
5532	10.0	9.5	8	2158	69 35	7 40	3737	12.0	4.5	4	1620	51 75	3 70
972	10.6	1.5	2	881	28 05	1 85	4582	12.0	5.5	5	1843	59 05	4 75
1295	10.6	2.0	2	962	30 60	2 10	5428	12.0	6.5	6	2065	66 80	5 80
1609	10.6	2.5	2	1036	32 90	2 10	6274	12.0	7.5	7	2280	73 30	6 60
1943	10.6	3.0	3	1140	36 35	2 65	7110	12.0	8.5	8	2494	80 25	7 60
2213	10.6	3.5	4	1251	40 05	3 45	7956	12.0	9.5	8	2682	86 20	7 85
2590	10.6	4.0	4	1325	42 40	3 45	8802	12.0	10.6	9	2898	93 55	8 65
2860	10.6	4.5	5	1443	46 35	4 50	9658	12.0	11.5	9	3091	99 18	9 10
3508	10.6	5.5	5	1591	50 95	4 50	1377	12.6	1.5	2	1150	36 60	2 10
4155	10.6	6.5	6	1783	57 25	5 55	1836	12.6	2.0	3	1289	41 15	2 65
4803	10.6	7.5	7	1968	63 25	6 35	2295	12.6	2.5	3	1369	43 65	2 65
5452	10.6	8.5	7	2123	68 15	6 60	2754	12.6	3.0	3	1466	46 75	2 90
6100	10.6	9.5	8	2314	74 35	7 65	3136	12.6	3.5	3	1563	49 85	3 15
1066	11.0	1.5	2	933	29 75	2 10	3672	12.6	4.0	4	1696	54 25	3 70
1421	11.0	2.0	2	1011	32 15	2 10	4053	12.6	4.5	4	1784	57 00	3 70
1777	11.0	2.5	3	1120	35 75	2 65	4971	12.6	5.5	5	2003	64 15	4 75
2132	11.0	3.0	3	1198	38 20	2 65	5890	12.6	6.5	7	2276	73 25	6 60
2428	11.0	3.5	4	1307	41 80	3 20	6808	12.6	7.5	7	2452	78 75	6 60
2843	11.0	4.0	4	1392	44 50	3 45	7726	12.6	8.5	8	2672	85 90	7 40
3139	11.0	4.5	4	1470	46 95	3 45	8644	12.6	9.5	8	2865	92 05	7 85
3850	11.0	5.5	5	1679	53 80	4 75	9638	12.6	10.6	9	3084	104 70	8 65
4561	11.0	6.5	6	1877	60 25	5 55	10481	12.6	11.5	9	3279	105 40	9 10
5272	11.0	7.5	7	2079	66 85	6 60	5378	13.0	5.5	6	2138	68 70	5 80
5982	11.0	8.5	8	2274	73 20	7 40	6370	13.0	6.5	6	2322	74 50	5 80
6694	11.0	9.5	8	2438	78 37	7 65	7363	13.0	7.5	7	2556	82 10	6 60
7405	11.0	10.6	8	2632	89 60	8 45	8356	13.0	8.5	7	2744	88 50	6 80
1165	11.6	1.5	2	976	31 10	2 10	9349	13.0	9.5	9	3045	98 15	9 10
1553	11.6	2.0	2	1058	33 65	2 10	10420	13.0	10.6	9	3250	110 50	9 55
1942	11.6	2.5	3	1164	37 15	2 40	11333	13.0	11.5	10	3481	112 20	10 55
2331	11.6	3.0	3	1246	39 70	2 40	12410	13.0	12.6	10	3684	124 45	11 00
2654	11.6	3.5	3	1335	42 50	2 65	5800	13.6	5.5	6	2187	70 25	5 55
3107	11.6	4.0	4	1457	46 55	3 45	6870	13.6	6.5	6	2388	76 60	5 80
3430	11.6	4.5	4	1548	49 50	3 70	7940	13.6	7.5	7	2984	84 20	6 60
4207	11.6	5.5	5	1760	56 40	4 75	9010	13.6	8.5	7	2816	90 30	6 80
4985	11.6	6.5	6	1976	63 40	5 55	10080	13.6	9.5	9	3129	100 85	9 10
5762	11.6	7.5	7	2176	69 95	6 60	11150	13.6	10.6	10	3378	115 05	10 35
6539	11.6	8.5	8	2380	76 57	7 40	12220	13.6	11.5	10	3580	115 45	10 55
7316	11.6	9.5	8	2552	82 00	7 65	13290	13.6	12.6	10	3778	127 75	11 00
8093	11.6	10.6	9	2756	93 75	8 45	6237	14.0	5.5	5	2262	72 50	5 20
1269	12.0	1.5	2	1020	32 50	2 10	7388	14.0	6.5	6	2518	80 85	6 20
1692	12.0	2.0	3	1140	36 45	2 65	8540	14.0	7.5	7	2765	88 90	7 00
							9691	14.0	8.5	8	2819	97 15	8 05

The above prices are based upon tanks made of 2 inch material. To find the list prices of tanks made of 2½ inch material, add 40 per cent. to above list; and add 60 per cent. to the list above to find the prices of tanks made of 3 inch material. Also add 35 per cent. and 70 per cent. respectively to weights given of 2 inch tanks to ascertain the weights of 2½ and 3 inch.

ROUND TANKS FOR ALL PURPOSES

Gallons.	Inside Diameter.	Inside Depth.	No. of Hoops.	Shipping Weight.	Price Complete, Riveted Hoops.	Price of Lugs, Extra.	Gallons.	Inside Diameter.	Inside Depth.	No. of Hoops.	Shipping Weight.	Price Complete, Riveted Hoops.	Price of Lugs, Extra.
	ft. in.	ft. in.		lbs.				ft. in	ft. in.		lbs.		
10843	14.0	9.5	9	3265	$105 15	$ 8 85	10264	16.6	6.5	7	3283	$105 55	$ 7 25
11995	14.0	10.6	9	3592	122 45	9 55	11864	16.6	7.5	8	3611	116 40	8 95
13146	14.0	11.5	10	3796	122 60	11 00	13464	16.6	8.5	8	3854	124 05	9 15
14298	14.0	12.6	10	4080	138 25	12 35	15064	16.6	9.5	8	4178	134 75	9 60
15449	14.0	13.5	10	4280	138 25	12 35	16660	16.6	10.6	9	4510	153 05	11 35
6691	14.6	5.5	5	2452	78 50	5 20	18264	16.6	11.5	9	4799	155 15	12 00
7925	14.6	6.5	6	2716	87 10	6 20	19864	16.6	12.6	11	5150	174 20	13 60
9160	14.6	7.5	7	2970	95 37	7 00	21464	16.6	13.5	11	5385	174 20	13 60
10395	14.6	8.5	8	3234	104 00	8 05	23064	16.6	14.6	11	5626	189 15	13 85
11631	14.6	9.5	9	3488	112 25	8 85	24664	16.6	15.5	13	5985	193 85	15 90
12866	14.6	10.6	9	3820	129 90	9 55	9197	17.0	5.5	5	2956	94 70	4 95
14102	14.6	11.5	10	4035	130 25	11 00	10894	17.0	6.5	7	3382	109 20	7 25
15326	14.6	12.6	10	4326	145 55	11 90	12592	17.0	7.5	7	3627	116 85	8 15
16573	14.6	13.5	10	4532	146 30	12 35	14290	17.0	8.5	8	3933	126 86	9 15
7160	15.0	5.5	5	2530	80 90	4 95	15988	17.0	9.5	9	4273	138 20	10 40
8412	15.0	6.5	6	2820	90 45	6 20	17827	17.0	10.6	9	4556	154 85	11 35
9804	15.0	7.5	7	3093	100 65	7 25	19384	17.0	11.5	9	4865	157 40	12 00
11126	15.0	8.5	8	3386	109 05	8 95	21233	17.0	12.6	9	5216	176 60	12 00
12448	15.0	9.5	8	3696	119 36	8 95	22639	17.0	13.4	11	5457	176 60	13 60
13778	15.0	10.6	9	3917	133 00	9 35	24619	17.0	14.6	12	5788	195 05	15 10
15090	15.0	11.5	9	4130	133 65	9 95	26035	17.0	15.4	13	6085	197 20	15 90
16413	15.0	12.6	10	4394	148 20	11 00	27733	17.0	16.6	14	6632	223 75	16 70
17735	15.0	13.5	11	4730	152 80	12 70	29431	17.0	17.4	15	6942	226 35	17 50
19057	15.0	14.6	12	4943	166 50	13 75	9746	17.6	5.5	5	3113	99 70	4 95
7645	15.6	5.5	5	2599	83 16	4 95	11545	17.6	6.5	7	3554	114 70	7 25
9057	15.6	6.5	6	2884	92 50	6 20	13344	17.6	7.5	7	3798	122 35	8 15
10468	15.6	7.5	7	3165	101 70	7 25	15143	17.6	8.5	7	4114	133 90	9 15
11880	15.6	8.5	7	3476	112 00	8 95	16943	17.6	9.5	8	4416	142 45	9 60
13390	15.6	9.5	8	3789	123 60	8 95	18892	17.6	10.6	9	4764	161 55	11 35
14702	15.6	10.6	8	3942	133 65	8 95	20541	17.6	11.5	9	5082	164 15	12 00
16114	15.6	11.5	9	4226	136 05	9 95	22490	17.6	12.6	9	5328	179 65	12 00
17526	15.6	12.6	10	4502	152 15	11 30	23990	17.6	13.4	11	5690	184 15	13 60
18937	15.6	13.5	11	4840	156 50	12 70	26088	17.6	14.6	12	5926	203 00	15 10
20349	15.6	14.6	12	5116	172 30	13 75	27588	17.6	15.4	13	6334	205 25	15 90
8147	16.0	5.5	5	2686	85 90	4 95	29387	17.6	16.6	14	6970	232 65	16 70
9651	16.0	6.5	7	3048	98 10	7 25	31186	17.6	17.4	15	7222	235 35	17 50
11155	16.0	7.5	8	3370	108 75	8 95	10312	18.0	5.5	6	3372	108 75	8 15
12659	16.0	8.5	8	3604	116 50	9 15	12215	18.0	6.5	7	3689	119 05	8 95
14163	16.0	9.5	8	3922	127 90	9 60	14118	18.0	7.5	8	4091	132 50	9 85
15667	16.0	10.6	9	4240	144 35	11 35	16021	18.0	8.5	9	4433	143 75	11 10
17171	16.0	11.5	9	4529	147 60	12 00	17924	18.0	9.5	9	4689	151 75	11 10
18675	16.0	12.6	11	4853	164 55	13 60	19827	18.0	10.6	9	5040	171 30	12 00
20179	16.0	13.5	11	5080	164 55	13 60	21730	18.0	11.3	10	5370	174 05	13 05
21683	16.0	14.6	11	5330	179 60	14 00	23475	18.0	12.6	11	5786	196 05	17 00
23187	16.0	15.5	13	5678	184 15	15 90	25378	18.0	13.4	11	6041	196 05	17 00
8664	16.6	5.5	5	2905	92 80	4 95	27281	18.0	14.6	11	6298	212 05	17 00

The above prices are based upon tanks made of 2 inch material. To find the list prices of tanks made of 2½inch material, add 40 per cent. to above lists; and add 60 per cent. to the lists above to find the prices of tanks made of 3 inch material. Also add 35 per cent. and 70 per cent. respectively, to weights given of 2 inch tanks, to ascertain the weights of 2½ and 3 inch.

4-COLUMN PATENT SECTIONAL STEEL TOWERS.

These List Prices are for both Round Column and Structural Steel Towers.

Height in Feet.	Capacities of Tanks that Towers will Support.	Shipping Weight Tower Complete.	Cost of Tower Complete.	Shipping Weight of Frost Proofing Material.	Cost of Frost Proofing forTop and Bottom of Tank.	Estimated Cost of Foundations.
CLASS O						
15	1,500 gallons and less.	1,569 lbs.	$ 74 25	200 lbs.	$10 25	$7 50
27		2,113 "	114 90			7 50
39		2,713 "	158 50			7 50
51		3,418 "	208 65			7 50
63		4,185 "	262 30			7 50
75		5,000 "	318 25			7 50
CLASS A						
15	2,000 to 3,000 gallons.	2,226 lbs.	$ 95 75	275 lbs.	$14 65	$12 50
27		2,933 "	145 30			12 50
39		3,714 "	198 60			12 50
51		4,525 "	255 15			12 50
63		5,436 "	315 45			12 50
75		6,361 "	378 25			12 50
CLASS B						
15	4,000 to 6,000 gallons.	3,301 lbs.	$130 80	425 lbs.	$23 20	$15 00
27		4,317 "	198 35			15 00
39		5,419 "	268 15			15 00
51		6,650 "	344 95			15 00
63		7,929 "	425 75			15 00
75		9,263 "	507 80			15 00
CLASS C						
15	7,000 to 10,000 gallons.	4,935 lbs.	$180 75	850 lbs.	$40 25	$20 00
27		6,414 "	272 80			20 00
39		8,000 "	371 10			20 00
51		9,712 "	475 90			20 00
63		11,548 "	586 95			20 00
75		13,507 "	704 80			20 00
CLASS D						
15	12,000 to 15,000 gallons.	6,721 lbs.	$233 80	1,075 lbs.	$51 45	$30 00
27		8,443 "	350 85			30 00
39		10,281 "	475 40			30 00
51		12,238 "	607 20			30 00
63		14,318 "	746 25			30 00
75		16,518 "	902 55			30 00
CLASS E						
15	15,000 to 20,000 gallons.	8,640 lbs.	$ 297 65	1,350 lbs.	$65 00	$40 00
27		10,828 "	436 45			40 00
39		13,165 "	583 25			40 00
51		15,652 "	738 55			40 00
63		18,296 "	901 85			40 00
75		21,086 "	1,069 40			40 00
CLASS F						
15	20,000 to 30,000 gallons.	10,515 lbs.	$ 364 25	1,575 lbs.	$79 80	$50 00
27		13,083 "	528 55			50 00
39		15,747 "	701 35			50 00
51		18,677 "	882 15			50 00
63		21,865 "	1,071 20			50 00
75		24,939 "	1,268 50			50 00
CLASS G						
15	30,000 to 40,000 gallons.	16,228 lbs.	$ 474 15	2,000 lbs.	$98 20	$60 00
27		19,384 "	678 05			60 00
39		22,723 "	891 85			60 00
51		26,243 "	1,115 05			60 00
63		29,949 "	1,348 60			60 00
75		33,850 "	1,592 15			60 00

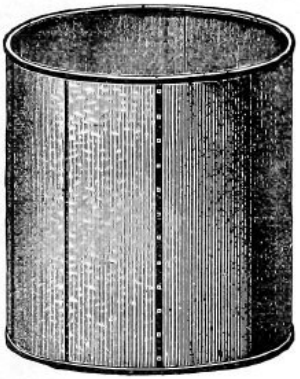
The heights above given are Standard and are from the ground or grade line to the bottom of the tank. Note the shipping weights given. We guarantee them to be correct.

The prices of Towers include the foundation at top of tower for tank with extension for octagonal walk-way, with iron hand rail and with iron ladder.

These Towers take a very low rate of freight. Write for delivered prices.

We also build these Towers in heights of 87 and 100 feet when desired.

Knocked Down Storage Tanks



Steel Tank Price List.

Adopted Dec. 17, 1902. Effective March 1, 1903.

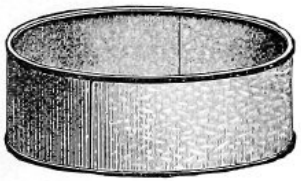
No.	Diam.	Height.	Capacity.	Weight.	Price.
50	6 ft.	6 ft.	41 bbls.	340 lbs.	$ 35 00
51	6 "	8 "	54 "	430 "	43 00
52	8 "	5 "	60 "	475 "	47 50
53	8 "	6 "	72 "	530 "	52 50
54	8 "	8 "	96 "	640 "	65 00
55	8 "	10 "	120 "	750 "	73 00
56	10 "	8 "	150 "	875 "	85 00
57	10 "	10 "	180 "	970 "	95 00
58	12 "	10 "	270 "	1400 "	128 00
59	12 "	12 "	324 "	1600 "	150 00

All knocked down Tanks are set up at our factory in order that every part may fit perfectly. Before knocking it down to crate, all parts are marked plainly, showing just where they belong. Every iron is bent to a proper circle and punched for rivets. Sufficient solder and rivets accompany each Tank to complete it.

Prices on special sizes quoted on application.

We recommend that Tank No. 50 be built of No. 20 material; Nos. 51, 52, 53 and 54 of No. 18; Nos. 55, 56 and 57 of No. 16; Nos. 58 and 59 of No. 14 or No. 12 material. Weights and prices as given above are based on No. 20 metal.

Round Stock Watering and Small Storage Tanks

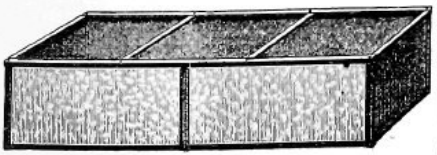


No.	Diameter.	Height	Capacity	Weight	Price
1	3 ft.	2 ft.	3½ bbls.	75 lbs.	$ 8 00
2	4 "	2 "	6 "	97 "	9 50
3	4 "	2½ "	7 "	112 "	10 75
4	4 "	3 "	9 "	130 "	12 75
5	4 "	4 "	12 "	160 "	16 00
6	4 "	5 "	14 "	200 "	19 00
7	4 "	6 "	18 "	225 "	23 75
8	4 "	8 "	24 "	277 "	26 00
9	5 "	2 "	9½ "	135 "	13 00
10	5 "	2½ "	12 "	150 "	14 50
11	5 "	3 "	14 "	170 "	15 50
12	5 "	4 "	19 "	193 "	21 00
13	5 "	5 "	24 "	245 "	23 75
14	5 "	6 "	28 "	280 "	28 00
15	5 "	8 "	37½ "	348 "	33 00
16	5½ "	8 "	45 "	390 "	39 00
17	6 "	2 "	14 "	170 "	19 00
18	6 "	2½ "	17 "	189 "	17 50
19	6 "	3 "	20 "	200 "	20 00
20	6 "	4 "	27 "	255 "	25 00
21	6 "	5 "	34 "	285 "	30 00
22	8 "	2 "	24 "	265 "	28 00
23	8 "	2½ "	30 "	290 "	30 00
24	10 "	2 "	37½ "	375 "	39 00
25	10 "	2½ "	46 "	410 "	42 00
26	12 "	2 "	54 "	550 "	53 00
27	12 "	2½ "	67½ "	600 "	58 00

Any of the above Tanks can be shipped in a box car, set up ready for use, except Nos. 22, 23, 24, 25, 26 and 27, which are shipped knocked down.

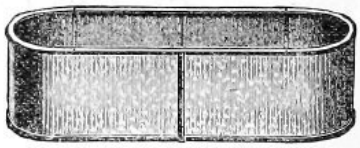
Always order by number.

Square End Stock Watering and Reservoir Tanks



No.	Width	Height	Length.	Capacity	Weight	Price
201	2 ft.	2 ft.	4 ft.	3½ bbls.	92 lbs.	$ 8 50
202	2 "	2 "	5 "	4½ "	105 "	9 50
203	2 "	2 "	6 "	5½ "	120 "	11 00
205	2 "	2 "	8 "	7½ "	158 "	16 00
207	2 "	2½ "	8 "	9½ "	175 "	18 00
208	2½ "	2 "	8 "	9½ "	175 "	17 50
210	2½ "	2½ "	8 "	12 "	195 "	19 50
211	3 "	2 "	8 "	11½ "	185 "	18 75
212	3 "	2 "	10 "	14 "	210 "	22 00
213	3 "	2½ "	8 "	14 "	210 "	20 50
214	3 "	2½ "	10 "	18 "	240 "	24 52
215	3 "	3 "	10 "	21 "	270 "	26 75
216	4 "	2 "	8 "	15 "	220 "	23 00
217	4 "	2 "	10 "	19 "	265 "	25 75
221	4 "	2½ "	8 "	17 "	250 "	25 00
222	4 "	2½ "	10 "	24 "	295 "	28 75
224	4 "	3 "	8 "	23 "	280 "	26 40
225	4 "	3 "	10 "	29 "	325 "	31 75

Round End Stock Watering and Reservoir Tanks



No.	Width	Height	Length	Capacity	Weight	Price
101	2 ft.	2 ft.	4 ft.	3½ bbls	70 lbs.	$ 7 00
102	2 "	2 "	5 "	4¾ "	86 "	8 70
103	2 "	2 "	6 "	5¾ "	103 "	10 25
104	2 "	2 "	7 "	6½ "	119 "	11 25
105	2 "	2 "	8 "	7½ "	137 "	12 25
106	2 "	2 "	10 "	9½ "	160 "	15 00
107	2 "	2½ "	8 "	9½ "	150 "	14 00
108	2½ "	2 "	8 "	9½ "	144 "	13 00
109	2½ "	2 "	10 "	12 "	180 "	16 00
110	2½ "	2½ "	8 "	12 "	150 "	15 00
111	3 "	2 "	8 "	11½ "	152 "	14 00
112	3 "	2 "	10 "	14 "	185 "	17 00
113	3 "	2½ "	8 "	14 "	166 "	16 00
114	3 "	2½ "	10 "	18 "	210 "	20 50
115	3 "	3 "	10 "	21 "	235 "	23 75
116	4 "	2 "	8 "	15 "	173 "	16 00
117	4 "	2 "	10 "	19 "	210 "	21 50
118	4 "	2 "	12 "	22 "	235 "	25 75
119	4 "	2 "	14 "	26 "	300 "	29 50
120	4 "	2 "	16 "	30 "	372 "	34 00
121	4 "	2½ "	8 "	17 "	190 "	20 00
122	4 "	2½ "	10 "	24 "	247 "	24 00
123	4 "	2½ "	16 "	38 "	400 "	38 00
124	4 "	3 "	8 "	23 "	215 "	22 00
125	4 "	3 "	10 "	29 "	277 "	28 50
126	4 "	5 "	10 "	47 "	440 "	41 00
127	5 "	2 "	16 "	38 "	412 "	40 00
128	5 "	2½ "	16 "	47 "	435 "	45 00
129	6 "	2 "	8 "	23½ "	240 "	23 00
130	6 "	2 "	10 "	28½ "	285 "	27 50
131	6 "	2 "	16 "	45 "	490 "	45 50
132	6 "	2½ "	8 "	28½ "	255 "	26 00
133	6 "	2½ "	10 "	35½ "	300 "	29 50
134	6 "	3 "	10 "	42½ "	325 "	32 50
135	6 "	4 "	10 "	56 "	434 "	44 00
136	6 "	5 "	10 "	70 "	540 "	54 00

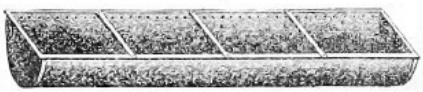
The above sizes are shipped set up ready for use.
Always order by number.

Regular Square End Troughs

Construction same as shown on Square End Stock Tank.

No.	Width	Height	Length	Capacity	Weight	Price
251	1 ft.	1 ft.	4 ft.	29 gal	52 lbs.	$ 5 50
252	1 "	1 "	5 "	37 "	60 "	6 25
253	1 "	1 "	8 "	58 "	80 "	8 50
254	2 "	1 "	4 "	58 "	70 "	6 50
255	2 "	1 "	5 "	74	80 "	7 50
256	2 "	1 "	6 "	89 "	90 "	8 50
257	2 "	1 "	8 "	119 "	115 "	10 50
258	2 "	1 "	10 "	149 "	140 "	12 50

Round Bottom Troughs



No.	Width	Depth	Length	Capacity	Price
901	14 inches.	7 inches	5 feet	½ bbl.	$ 3 80
902	14 "	7 "	8 "	¾ "	4 75
903	14 "	7 "	10 "	1 "	5 50
904	20 "	10 "	8 "	1⅔ "	6 25
905	20 "	10 "	10 "	2⅛ "	7 25
906	23 "	11½ "	8 "	2½ "	7 00
907	23 "	11½ "	10 "	3 "	8 00
908	26 "	13 "	8 "	3 "	7 25
909	26 "	13 "	10 "	4 "	8 50
910	32 "	16 "	8 "	4¾ "	10 50
911	32 "	16 "	10 "	6 "	12 00
912	36 "	18 "	8 "	6¾ "	11 50
913	36 "	18 "	10 "	8¾ "	13 00
914	42 "	21 "	8 "	9 "	14 00
915	42 "	21 "	10 "	11¼ "	16 50
916	48 "	24 "	8 "	12 "	16 00
917	48 "	24 "	10 "	15 "	18 00

Troughs Nos. 901, 902 and 903 are intended for hog and sheep feeding purposes, and are furnished with strips across top twelve inches apart, when desired.

Troughs shipped without strips unless specified in order.

Angle steel supports to hold round bottom troughs upright will be furnished when desired, at small extra cost.

List of Tank Roofs

Diameter of Tank	Weight	Price
8 feet	1,000 pounds	$ 30 00
10 feet	1,300 pounds	40 00
12 feet	1,500 pounds	50 00
14 feet	2,000 pounds	65 00
16 feet	2,600 pounds	75 00
18 feet	3,300 pounds	100 00
20 feet	4,300 pounds	115 00
22 feet	5,200 pounds	130 00
24 feet	6,000 pounds	150 00
26 feet	7,000 pounds	180 00
28 feet	8,000 pounds	220 00
30 feet	9,200 pounds	260 00

Tank Lugs and Bolts

Used for Tightening Hoops to Round Tanks

ONE-BOLT LUG

TWO-BOLT LUG

PRESSED STEEL TANK LUG

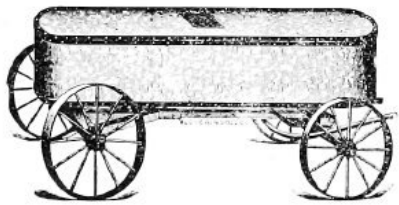
PRICE LIST

Size of Hoop.	Plain Pressed Steel.	Galvanized Pressed Steel.	Cast Iron.
1½ inch.	$ .30	$ .40	$ .33
1¾ "	.30	.40	.35
2 "	.35	.50	.35
2¼ "	.40	.55	.55
2½ "	.50	.65	.80
3 "	.65	.90	.90
3½ "	.80	1.20	.95
4 "	1.00	1.50	1.05
4½ "	1.25	1.70	1.50
5 "	1.40	2.00	1.75
5½ "	1.70	2.40	2.00
6 "	2.00	3.00	2.25

Price List of Tank Trestles

Size of Tank	Height of Trestle	Shipping Weight	Price Galvanized	Painted
6 x 6	15 feet	1012	$ 73 00	.....
8 x 6	10 feet	814	63 00	.....
8 x 6	15 feet	1012	73 00	.....
8 x 6	20 feet	1111	82 00	.....
8 x 7	10 feet	936	69 00	.....
8 x 7	15 feet	1102	82 00	.....
8 x 7	20 feet	1298	93 00	.....
8 x 8	10 feet	1118	81 00	.....
8 x 8	15 feet	1348	94 00	.....
8 x 8	20 feet	1553	108 00	.....
10 x 6	20 feet	1111	82 00	.....
10 x 7	20 feet	1286	93 00	.....
10 x 7	30 feet	1738	132 00	.....
10 x 8	25 feet	1850	132 00	.....
10 x 8	35 feet	2457	176 00	.....
10 x 10	20 feet	1669	114 00	$100 00
10 x 10	25 feet	1878	130 00	113 00
10 x 10	30 feet	2296	161 00	140 00
10 x 10	40 feet	3034	215 00	180 00
10 x 10	50 feet	3811	265 00	225 00
12 x 12	25 feet	3050	205 00	180 00
12 x 12	30 feet	3530	240 00	205 00
12 x 12	35 feet	4232	270 00	225 00
12 x 12	40 feet	4931	300 00	255 00
12 x 12	50 feet	5056	370 00	310 00
12 x 14	20 feet	3169	195 00	170 00
12 x 14	30 feet	4434	285 00	240 00
12 x 14	40 feet	5668	365 00	305 00
12 x 14	50 feet	6937	450 00	379 00
14 x 12	20 feet	2914	.....	165 00
14 x 12	25 feet	3335	.....	188 00
14 x 12	30 feet	3868	.....	218 00
14 x 12	35 feet	4452	.....	242 00
14 x 12	40 feet	5093	.....	274 00
14 x 12	50 feet	6242	.....	331 00
14 x 12	60 feet	7400	.....	387 00

U. S. Galvanized Steel Wagon Tanks



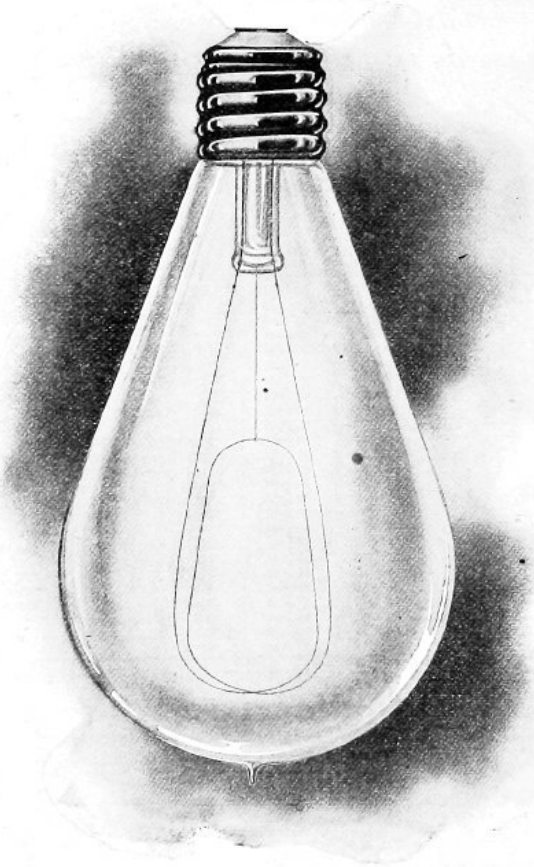
Prices and Specifications

No	Width	Height	Length	Capacity	Weight	Price
W1	3 ft.	2 ft.	10 ft.	14 bbls.	296 lbs.	$29 00
W2	3 "	2 "	8 "	12 "	260 "	25 00
W3	2½ "	2 "	8 "	9½ "	235 "	23 00
W4	2 "	2 "	8 "	7½ "	213 "	21 00
W5	2 "	2 "	6 "	5¼ "	180 "	18 00

Always order this style Tank by number.

Our prices are for the Tanks alone without the wagon.

Prices on other sizes and styles, or on Tanks made of heavier or lighter material, will be quoted on application.



INCANDESCENT LAMPS.

All voltages 45 to 130.

6, 8, 10, 16, 20 C. P., 250 lamps in bbl. . each,	$0 20
32 C. P., 200 lamps in bbl. . . . . each,	30
50 C. P., 150 to 175 lamps in bbl. . . . . each,	55
Frosted or dipped colored, each additional,	04
16 C. P., 200 to 250 volts, 250 to bbl. . . . . each,	22

Barrels weigh about 55 lbs. each.

NOTE.—The prices above quoted are for Lamps with Edison or Westinghouse bases only. One cent extra will be charged for lamps with Thompson-Houston base.

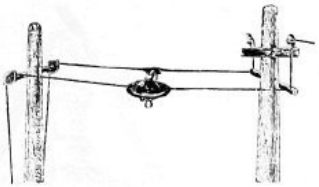
In sending your order, always state the Candle Power, Voltage and Base you desire.

Edison.

Westinghouse or Sawyer-Man.

Thompson-Houston.

Outdoor Lighting Specialties



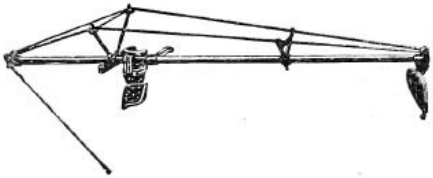
Cutter's Always Level Streethood

The only Suspension Streethood that will stay perfectly level in windy weather.

(State base of socket wanted)

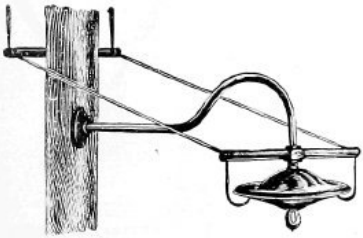
Cutter's Arc Hood

The hood with the extra strong cross-arm. With or without absolute cut-out switch



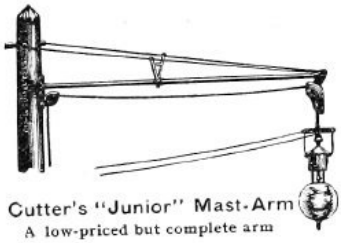
Cutter's Wind-Braced Mast-Arm

An unusually well braced and complete Mast-Arm, built in lengths of 10 to 20 feet



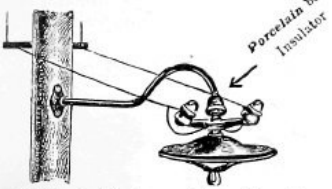
Cutter's Standard Streethood

An up-to-date Streethood with enameled cross-arm, bolted fittings and porcelain shell socket



Cutter's "Junior" Mast-Arm

A low-priced but complete arm

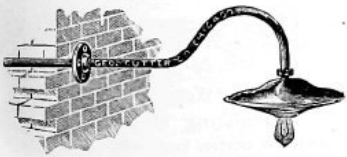


Cutter's Eastern Streethood

(With High Voltage Insulator above an iron cross-arm supporting glass insulators)

Cutter's Triple Insulation Arm

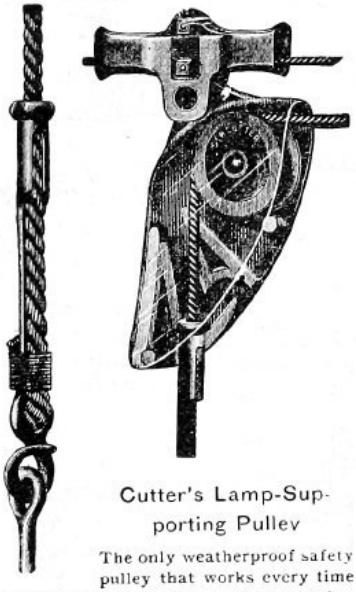
The only insulating cross-arm adapted to high voltage circuits. Made with porcelain bell, and with an enamel weatherproofed arm having metal-bound ends which cannot split



Cutter's Wall Hood

With pipe extending through wall

Outdoor Lighting Specialties



Cutter's Lamp-Supporting Pulley

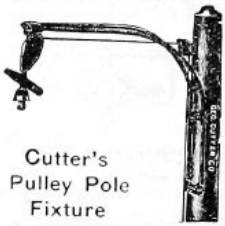
The only weatherproof safety pulley that works every time and the only one having no extra catches or fingers to bend, stick or get clogged with sleet

Cutter's High Voltage Rope Insulator

Allows wire hoisting ropes to be used safely with high voltage arc lamps

Cutter's Reflector Poletop

With extra wide spread of pipes and a Cutter High Voltage Insulator at the top

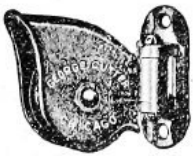


Cutter's Pulley Pole Fixture

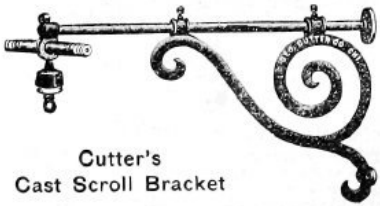
A three-foot fixture which lowers lamp for trimming

Cutter's Swivel Pole Pulley

Weatherproof: The pole pulley with the unbreakable pole-plate



The only geared and locking windlass that can also be used as a plain windlass for quick lowering



Cutter's Cast Scroll Bracket

3 foot, with High Voltage Cross-Arm

Cutter's "Banner Core" Hoisting Rope

A fine braided cotton rope with a weatherproof finish which keeps out the rain and makes it extra durable. We recommend the 3/8 and 1/2-inch sizes for hoisting arc lamps, and the 3/16-inch for the "Always Level Streethood"

ELECTRIC CORDS.

Arc Lamp and Trolley Cord, plain or **"Spot,"** waterproofed:
Arc Light Cord, No. 12 cotton, plain or waterproofed.....list, per lb., $0.50
Trolley Cord, No. 8 cotton, plain or waterproofed..... " " .50
Armor Cord, No. 4 cotton, plain or waterproofed.....list, per yard, .01
Silver Lake Arc Light Cord, No. 12 Cotton, waterproofed.....list, per lb., .35
" " " No. 12 Italian, " ..... " " .40
" " " No. 12 Linen, " ..... " " .57½
" Trolley Cord, Nos. 8, 9 and 10, waterproofed, Cotton..... " " .35
" " " Nos. 8, 9, 10 and 12, " Italian..... " " .40
" " " Nos. 8, 9, 10 and 12, " Linen..... " " .57½

IMPERIAL SOLID BRAIDED COTTON ROPE.

For Dumb Waiter Cord, Drum Banding, Lifts, Lariats, etc.

No. 14. 1/8 in. diam., weight about 7 lbs. to 100 ft.
No. 16. ½ " " " " 8½ " to 100 ft.
No. 18. 5/8 " " " " 11 " to 100 ft.
No. 20. ¾ " " " " 13 " to 100 ft.
No. 24. ¾ in. diam., weight about 17 lbs. to 100 ft.
No. 28. ⅞ " " " " 23 " to 100 ft.
No. 32. 1 " " " " 28 " to 100 ft.

Silver Lake, white cotton.....list, per lb., $0.35 Discount....per cent.
" " drab " ..... " " .40 " .... "
Samson, white cotton..... " " .50 " .... "
" drab " ..... " " .55 " .... "
" Italian..... " " .50 " .... "
" Linen..... " " .70 " .... "

SOLID BRAIDED BELL CORD COUPLINGS.

We send size for No. 8 cord unless otherwise ordered.

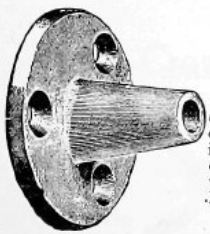
DIRECTIONS.—Draw the end of the cord through the coupling, and insert the screw far enough to bury its head. Then pull the cord back into place.

PRICES, COMPLETE WITH SCREWS.

Japanned (malleable iron).....per doz. hooks, $0.60
Brass..... " " 1.25
Nickel plated (brass)..... " " 1.50

VALVE CORD HOOKS.

For use with air brake and air signal systems; with socket for firmly holding the cord. Furnished in brass, in size for No. 6 or No. 7 cord, complete with screws....per doz., $1.00



VALVE CORD FASTS.

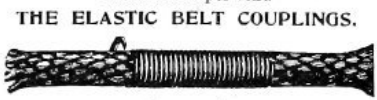
For securing the valve or signal cord to the end of the coach. Furnished in brass, in size for No. 6 or No. 7 cord, complete with all screws.
Price.....per doz., $2.50

ROPE COUPLINGS.

We furnish steel couplings similar to the above cut, drilled and fitted with pins. They can be firmly riveted to the braided rope, the end of which should first be tightly wound with wire or strong twine.

⅜ in. diam., pair, $0.25 | ⅝ in. diam., pair, $0.50
7/16 " " " .30 | ¾ " " " .75
½ " " " .35 | ⅞ " " " 1.10
9/16 " " " .40 | 1 " " " 1.50
Discount....per cent.

THE ELASTIC BELT COUPLINGS.



Japanned.

No. 4. For belt ¼ inch diameter...per doz., $0.40
No. 6. " 3/16 " " ... " .60
No. 8. " ¼ " " ... " .80
No. 10. " 5/16 " " ... " 1.00
No. 12. " ⅜ " " ... " 1.20
No. 14. " 7/16 " " ... " 1.40
No. 16. " ½ " " ... " 1.60
No. 24. " ¾ " " ... " 2.40

Braided cord with the elastic coupling is unequaled as belting for driving sewing machines and all other light machinery.

CORD GRIPS.

Jenks' Patent.

Kept in stock for Nos. 8, 12 and 16 cord.

No. 8 may also be used to splice No. 5 cord. No. 12 may also be used to splice No. 8 cord. No. 16 may also be used to splice No. 12 cord.

No. 12

Japanned or tinned.

No. 8.....per doz., $0.20
No. 12..... " .30
No. 16..... " .40

Linemen's Tools.

Tamping and Digging Bars—Solid Steel.

No. 309 Octagon. 1 inch diameter, 7 feet long, weighs 19 pounds.
" 310. " 1¼ " 8 " " 30 "

Wood Handle Tamping Bars.

Handles made from Selected Second Growth Ash.

No. 311. Handles 8 feet long, with iron shoe

A "Slick" Digging Tool.

A very useful tool for digging post holes in hard soil.

No 311½
No. 311½, 8 ft hard wood handle, with steel point, each, $4.00.

Pike Poles—"Never Break" Brand.

Made from Selected Second Growth Ash or Spruce, Straight Grain. Pikes from Crucible Steel.

No 312. 12 feet No. 313 14 feet. No 314 16 feet.
No 315 18 feet No 316 20 feet

Raising Forks—"Never Break" Brand.

Made from Selected Second Growth Ash or Spruce, Straight Grain. Forks from Crucible Steel.

No 317 12 feet No. 318. 14 feet. No. 319 16 feet.
No 320 18 feet. No. 321. 20 feet.

Linemen's Tools.

Post Hole Shovels—Reinforced Handles.

Selected Second Growth Ash.

No 301 7 foot handle, oil finish
" 302 8 "

Post Hole Spoons.

Selected Second Growth Ash Handles.

No. 303. W U Pattern, 7 foot handle, oil finish.
" 304 " " 8 " "

Digging Bars—Solid Steel.

Will Cut Roots and Break Rocks.

No 305. Round, 1¼ inch diameter, 8 feet long, weighs 27 pounds.
" 306. Octagon, 1⅛ " 8 " " 28 "

Crow and Digging Bars—Solid Steel.

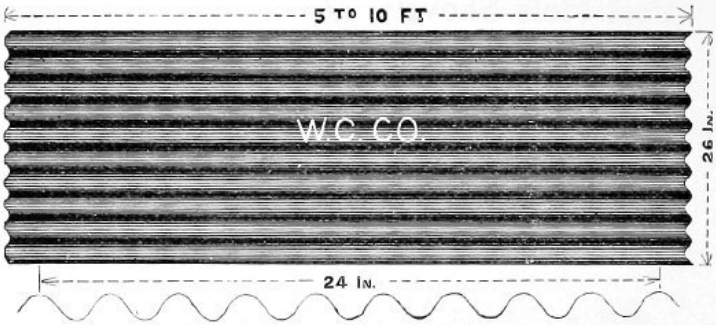
A Very Useful Tool.

No. 307. Octagon, 1 inch diameter, 7 feet long, weighs 17 pounds.
" 308. " 1¼ " 8 " " 28 "

IRON AND STEEL ROOFING.

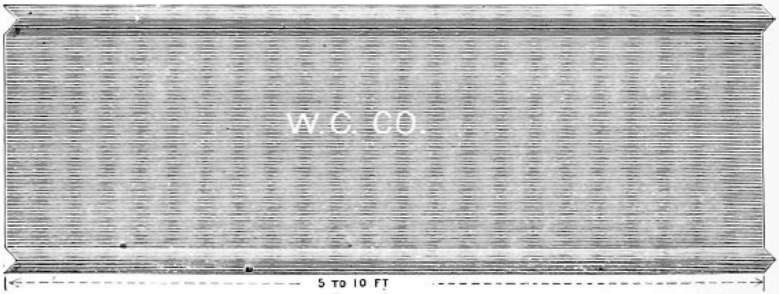
CORRUGATED SHEETS.

Galvanized or Painted, for Roofing or Siding.



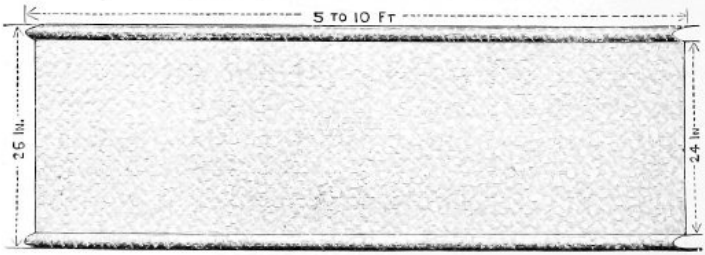
Made in all gauges, 16 and lighter, 2½ inch corrugation.

V CRIMP ROOFING.



Made in all gauges, 24 and lighter, galvanized or painted.

PRESSED STANDING SEAM ROOFING.



Made in all gauges, 24 and lighter, galvanized or painted.

Sheets 5, 6, 7, 8, 9, 10 and 12 feet long, galvanized and painted red, are carried in stock.

No. 1. "Rok Top" Gravel Surface Roofing.

The acknowledged standard of its grade. Suitable for residences, factories, warehouses, barns, etc. This cut shows how this roofing is made. Further comment is unnecessary. Proof against fire, water and chemicals. Any one can lay it.

In rolls of 108 sq. ft., about 125 lbs. to 100 sq. ft.....per sq., $4 10

No. 408. Flint Coated Roofing and Siding.

This is unequaled for general roofing and siding purposes, such as manufacturing plants, foundries, elevators, residences, etc. Can be painted any color.

In rolls of 216 sq. ft., about 50 lbs. to 100 sq. ft.....per sq., $3 00

No. 1903. Asphalt Waterproof Roofing.

This roofing is acid, water and fire proof and is the best piece of roofing on the market for the price.

In rolls of 108 sq. ft., weighs about 75 lbs. to 100 sq. ft.....per sq., $3 00

The above prices include necessary roofing nails, caps and cement for laps.

TARRED FELT ROOFING.

Darktown Tarred Ready Roofing. Put up in rolls of 108 sq. ft. to roll.

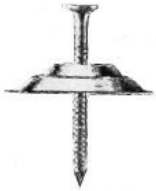
3 ply weighs about 65 to 70 lbs. to roll.....per sq., $1 65

2 " " " 42 " 45 " " " " ..... " 1 20

ASPHALTUM COATING.

Our Asphaltum Coating is a first-class coating for any prepared or paper roofing. After coating roof, cover with coarse sand to get best results.

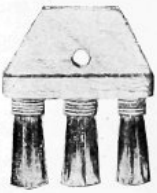
	Bbl.	Half Bbl.	10 Gal. Can.	5 Gal. Can.	3 Gal. Can.	2 Gal. Can.	1 Gal. Can.
For 2 and 3 ply, per gal.....	$0.20	.24	.40	.50	.55	.60	.70



BARBED ROOFING NAILS AND TIN ROOFING CAPS.

Our Roofing Nails run even and are made with large heads..per lb., $0.08
" " Caps are made from heavy tin and do not curl up at edges.....per lb., .10

3-KNOT ROOFING BRUSHES.



For painting and coating large roofs our brushes are time-savers, and in one day will pay for themselves. Can be used again by putting in a pail of water to soften.
Each.....$2.00

SISAL BRUSH.

An inexpensive brush for coating small roofs or putting asphalt on laps. It is not affected by hot asphalt or pitch.
Each.....$3.00

ASPHALT ROOFING CEMENT.

	Bbl.	Half Bbl.	10 Gal. Can.	5 Gal. Can.	3 Gal. Can.	2 Gal. Can.	1 Gal. Can.
Per bbl.....	$2.50	2.60	....	....	....	....	....
" gal.....	....	....	$0.60	.65	.70	.75	.80

DRY KILN AND BUILDING PAPERS.

ZELNICKER.

The best and heaviest Dry Kiln Paper known. Made from pure manila, for lining dry kilns, ice houses, refrigerator cars, refrigerators and cold storage buildings.

Put up in rolls 36 inches wide, containing 1,000 square feet.....per roll, $11 25

"KILN KLUB."

A Building Paper for Dry Kilns.

This Paper is manufactured especially for lining dry kilns, refrigerators, cold storage buildings, ice houses, etc.

The best non-conductor made for the above purpose. Very tough and free from grease or oil of any kind. Does not deteriorate with age, but will last as long as the building. Satisfaction guaranteed.

Put up in rolls 36 inches wide, containing 1,000 square feet.....per roll, $9 00

No. 210 RAWHIDE ROOFING AND SIDING.

Is not injured by being exposed to the weather.
Will last longer when painted.

In rolls 36 inches wide, 250 square feet each.....per roll, $4 50

P & B INSULATING, BUILDING AND SHEATHING PAPERS.

This Paper is made from the best grade of paper stock and thoroughly coated with P & B Compound. It is water, acid and alkali proof, odorless, and clean to handle.

Rolls 36 inches wide, containing 1,000 square feet each.

	Approximate shipping weight.		
1 ply	30 lbs.,	per roll,	$ 3 75
2 "	40 "	"	6 25
3 "	65 "	"	10 00

"UNIVERSAL" BUILDING PAPER.

This Paper is thoroughly coated with P & B Compound, is water, acid, alkali and gas-proof, and will not decay.

Rolls 36 inches wide, containing 1,000 square feet each.

	Approximate shipping weight.		
1 ply	33 lbs.,	per roll,	$3 00
2 "	40 "	"	3 75

GIANT PAPER.

Unexcelled for refrigerator, cold storage and refrigerator car insulation. Waterproof, air tight and odorless. This Paper is made from the best paper stock, thoroughly saturated and coated with the P & B Compound. Can not absorb moisture and will not decay with age.

Rolls 36 inches wide, containing 1,000 square feet each.

	Approximate shipping weight.		
1 ply	40 lbs.,	per roll,	$ 4 50
2 "	55 "	"	8 00
3 "	100 "	"	11 00

Descriptive pamphlet, samples and discounts sent on application.

ROSIN SIZED SHEATHINGS.

These papers are made from selected stock, carefully sized with rosin and calendered so as to have a perfectly smooth and uniform surface. They are clean to handle, odorless, vermin-proof and inexpensive. Put up in 36 inch rolls, each roll guaranteed to contain 500 square feet.

	Approximate weight.		
X-L, Special Run, red	18 lbs.,	per roll,	$0 50
Advance, "	20 "	"	60
Medium, "	25 "	"	75
Comanche, "	30 "	"	90
Aztec, "	35 "	"	1 05
Trojan, "	40 "	"	1 20
Alpine, gray	25 "	"	75
Chieftain, "	35 "	"	1 05

MOHEGAN INSULATING PAPER.

Made from selected long stock, a high class and desirable insulating paper, especially adapted for use in packing houses, ice and cold storage plants and refrigerators. Put up in rolls 36 inches wide. Carried in stock as follows:

	Square feet to roll.	Approximate shipping weight.		
2 ply	500	30 lbs.,	per roll,	$2 25
2 "	1,000	60 "	"	4 25
4 "	500	40 "	"	3 50

RUBBEROID ROOFING.

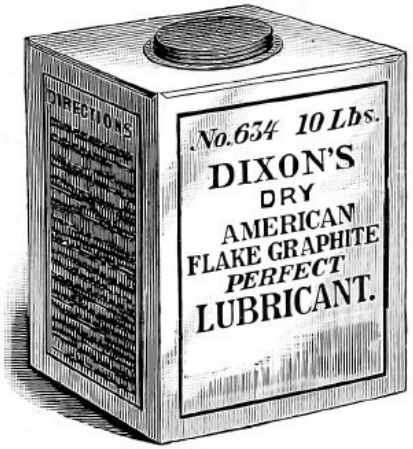
For foundries, factories, chemical, acid, and gas works, and all permanent buildings, it especially commends itself. It is impervious to such severe conditions as the presence of fumes and gases from furnaces, great heat, and sudden changes of temperature. Rubberoid makes a most attractive and durable siding for farm and hot-houses, buildings, factories, etc.

	Approximate shipping weight, per square.		
½ ply	26 lbs.,	per sq.,	$2 50
1 "	33 "	"	3 25
2 "	44 "	"	4 75
3 "	54 "	"	6 00

The cement necessary for seams, the nails and caps, together with sufficient extra material to make a 2 inch lap at seams, are included in these prices and weights.

Send for descriptive pamphlet, samples, special discounts and testimonials.

PURE FLAKE LUBRICATING GRAPHITE.



1 lb. paper cans, 36 in case	each,	$0 20
5 " tin " screw top, 1, 5, 10 in case	each,	85
10 lb. tin cans, screw top, 1, 2, 5 in case	each,	1 60
25 lb. paper bag enclosed in case, per lb		15
50 lb. paper bag enclosed in case, per lb		14½
100 lb. keg	per lb.,	14
200 " half barrel	"	14
350 " barrels	"	12

GRAPHITE AXLE GREASE.

1 lb. cans, 36 in case	each,	$0 15
2 " " 36 " "	"	25
10 " firkins, 6 " "	"	1 20
25 " "	"	2 75
50 " kegs	"	5 00
100 " "	"	9 00
200 " half barrels	per lb.,	08½
375-400 lb. barrels	"	08½

SILICA-GRAPHITE PAINT.

For Metal, Wood Work, Roofs and Poles.

For Bridges, Smoke Stacks, Boiler Fronts and Iron Work.

No. 2, natural color; No. 3, dark red; No. 4, boiler and stack color.

Thinned, Ready Mixed.

½ gal. in pail.....per gal.,	$1 60	10 gals. in keg.....per gal.,	$1 40
1 " " " ..... "	1 50	25 " " half bbl ..... "	1 35
5 gals. " keg ..... "	1 45	Bbl. (about 50 gals.)..... "	1 30

GRAPHITE PIPE JOINT COMPOUND.

1 lb. cans, 36 in case.....per lb.,	$0 20		
5 " " 12 " " ..... "	18		
10 " " 6 " " ..... "	15		
25 " " 1 " " ..... "	14		
50 " kegs..... "	13½		
100 " " ..... "	13		

1 lb. bars in paper boxes, 25 one lb. bars in case..... per case, $6 00

DIXON'S SOLID Belt Dressing

Prevents slipping, increases power.

Cold Water Paint

LYTHITE COLD LYTHITE TRADE MARK WATER PAINT

FOR EXTERIOR AND INTERIOR PAINTING.

Weatherproof and Interior Brands.

Lythite Cold Water Paints are strictly *PAINTS* and not Kalsomines.

Substitutes for Oil Paint at about one half the cost.

Furnished in Dry Powder form in white and many colors.

By simply the addition of Cold water a paint is produced and ready for use.

It is a dry powder which mixes readily with Cold water.

Anyone can apply it.

Will last for years; is unaffected by gases.

Can be used with as good results either as a final coat for oil painted surfaces or as a priming coat for oil paint.

One coat covers better than two coats of oil paint.

One coat is all that is required.

A great saving over oil paint in material as well as labor.

IMPORTANT.

Hot water must never be used with Interior or Weatherproof Lythite Cold Water Paint.

WEATHERPROOF

Lythite Cold Water Paint designed for outside use on wood, stone and brick surfaces.

Will stand Rain and Weather Exposure.

RESISTS WATER. RESISTS FIRE.

INTERIOR.

Lythite Cold Water Paint designed for inside use on wood, stone and brick surfaces of

Factories. Warehouses. Electric Plants, Breweries. Cold Storage Plants. Farm Buildings Docks. Vessels. Tenement Houses. Summer Cottages. Etc.

The best Fire Proof Paint made

DIRECTIONS.

The following directions apply to either the Weatherproof or Interior brands.

Add one part of cold water to two parts of powder, forming a thick paste which should be stirred until all lumps are removed. To thin down to the required consistency, add more cold water slowly, stirring all the time. Be careful not to get the mixture too thin. For rough work the solution is not required to be as thick as that used on smooth work. For smooth work the consistency of thick cream or oil paint is about right.

Brush on like oil paint. If Interior is used the surface must be cleared of all loose particles. If Weatherproof is used over whitewash all the whitewash must first be removed. Strain for fine work.

Surface One Pound Weatherproof or Interior Will Cover.

(5 lbs. will make a gallon.)

The amount of surface that one pound will cover depends on the character of the surface.

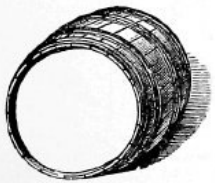
The following table has been found to be substantially correct.

Smooth hard boards	50 to 75	square feet.
Rough boards	25 to 40	"
Brick	25 to 40	"
Stone	25 to 40	"

Write for Color Card and Prices.

FLATAU'S

WEATHER AND FIREPROOF PAINT



Carbon Paint

NOTICE THE NECESSITY FOR THE PRESERVATION AND PROTECTION OF ALL STRUCTURAL WORK COMPOSED OF STEEL, CORRUGATED IRON, METAL ROOFS, PIPES, BRIDGES, ELEVATED WAYS, SMOKE STACKS, BREECHING CONNECTED WITH ALL BATTERIES OF BOILERS, SEA-GOING VESSEL HULLS OR FRESH WATER CRAFTS OF ANY KIND.

ONE GALLON OF THIS PAINT will cover perfectly three squares or 300 square feet, and could if necessary be made to cover more, with a thinner of any kind except COAL OIL OR GASOLINE.

FOR GINNERS, COTTON OIL MILLS, COTTON COMPRESSES OR OTHER MANUFACTURING PLANTS, TIN, WOOD OR METAL ROOFS.

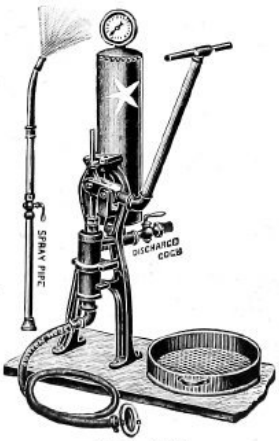
WHITEWASH, PAINTING AND SPRAYING MACHINES.

Style "H."

Style "E."

Star Whitewashing, Painting, Spraying and Disinfecting Machines.

Below will be found a table showing the several styles of machines, together with their relative capacities, price lists and weights:



Style "B."

Style.	Times Faster than Man with Brush.	Price List.	Gross Weight.	Net Weight.
"A"	25 Times	$70 00	140 lbs.	80 lbs.
"B"	20 "	60 00	130 "	70 "
"C"	12 "	50 00	110 "	60 "
"D"	8 "	40 00	90 "	50 "
*"E"	12 "	60 00		
"F"	12 "	50 00	120 "	95 "
"G"	8 "	40 00	65 "	55 "
"H"	5 "	16 00	25 "	17 "

*Not recommended for export.

CRAYON.

No. 0. Hexagon, 6 inches long, 5/16 inch thick, blue wrapped, packed 1 dozen in box.
Price ..... per gross, $3 50

Size, 4¼ inches long, tapers ⅝ to ½ inches in diameter.
No. 1. Paper covered and pointed, packed 1 gross boxes. Price..... per gross, **$6 00**

Size, 5x½x¼ inches.
Paper covered and pointed, packed 1 gross boxes, 16 gross cases, weight of case 165 lbs.
No. 2. Price "Compo" per gross, $2 50 No. 3. Genuine, per gross, $5 00

Size, 5x½x½ inches.
No. 4. Paper covered and pointed, packed 1 gross boxes, 12 gross cases, weight of case 165 lbs. Price "Compo"..... per gross, $4 00

Size, 5x1x1 inches.
No. 5. Paper covered and pointed, packed 2 doz. in box, 3 gross in case, weight of case 190 lbs. Price "Compo"..... per gross, $7 00

Per gross.....net, **$6.50**

"ZELNICKER"

Per gross.....net, **$6.50**

LUMBER

Per gross.....net, **$6.50**

CRAYONS

Per gross.....net, **$4.00**

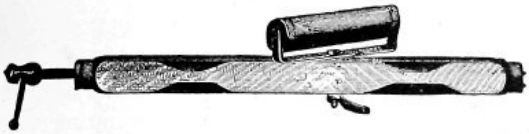
THESE CUTS SHOW EXACT SIZE AND COLORS OF OUR ZELNICKER CRAYONS

LONGER THAN OTHERS. COLORS THAT WILL NOT WASH OFF

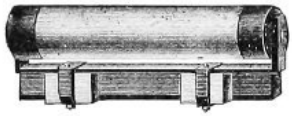
When ordering state whether **SOFT CRAYONS** for **GREEN LUMBER**, or **HARD CRAYONS** for **DRY LUMBER**

Put up in one-fourth gross boxes. One and three gross cases.
Weight of one gross case, 16 lbs.
" " three " " 40 "

CAR DOOR ROLLERS.



Side Roller.



End Roller.

Side Roller, beam 4½ feet, screw 16 inches, over all 5 feet 10 inches, roller 15 inches long, weight 38 lbs.....each, $7 50
End Roller, weight 13 lbs..... " 5 00

GOODYEAR PATENT LOAD BINDER.

The Goodyear Patent Load Binder is unsurpassed for binding logs, hay, lumber, pipe, and large loads of every description.

The Binder fits any chain from ¼ to $\frac{11}{16}$ of an inch, is easily applied, and is the greatest time-saver for teamsters ever invented.

Price.....per pair, $5 00

ZELNICKER SHINGLE BANDS.

Black, ½ inch wide, 11 inches long, 26 gauge.....per lb., $
" ½ " " 12 " " 26 " ..... "
" ½ " " 13 " " 26 " ..... "
" ½ " " 14 " " 26 " ..... "
Galvanized, ½ inch wide, 11 inches long, 26 gauge..... "
" ½ " " 12 " " 26 " ..... "
" ½ " " 13 " " 26 " ..... "
" ½ " " 14 " " 26 " ..... "

The above bands, either black or galvanized, ½, ⅝ or ¾ inch wide, from 12 to 19 inches long, in 24, 26 or 27 gauge.

We can furnish **cut steel** or **rolled steel** bands.

PORTLAND PICKET POINTER.

Illustration shows our *improved* picket pointing machine, especially designed to meet the demand for an efficient, simple and rapid picket pointer.

It makes a handsome point, either short, medium, or long, as may be desired.

The machine is adjustable for flat pickets of any width from 1½ inches to 6 inches, and square pickets from 1 inch to 1½ inches, and will point pickets of any length.

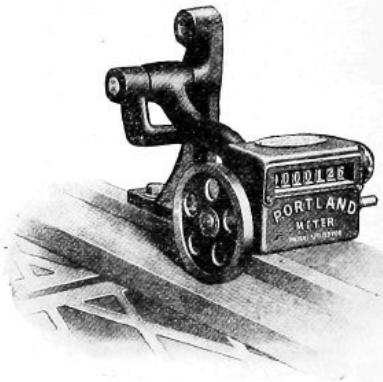
Price.....$25 00

PORTLAND LUMBER METER.

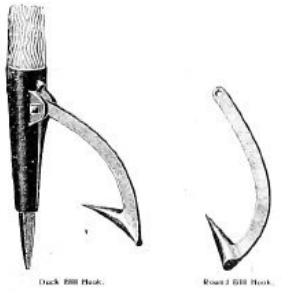
This little meter will indicate the quantity produced, tell at a glance at what speed your machine is feeding, and show the machine tender at any time the exact number of feet that have run through.

The only first-class meter on the market.

10,000	feet capacity.....	$18 00
100,000	" "	24 00
1,000,000	" "	30 00
10,000,000	" "	36 00



LIGHT DRIVING PEAVEY
MALLEABLE IRON SOCKET.



Price List.

With Hard Maple Handles and Round or Duck Bill Hooks.

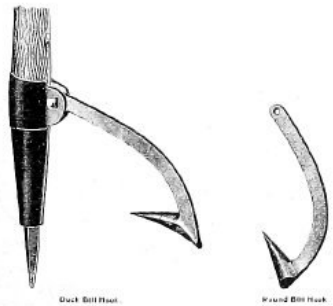
	Per Doz.
No. 1, 2½ inch x 4, 4½ or 5 ft. handles	$27 50

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 2, 2½ inch x 4, 4½ or 5 ft. handles	$30 00

LIGHT DRIVING PEAVEY.

With Wrought Steel Socket and Clasp



Price List.

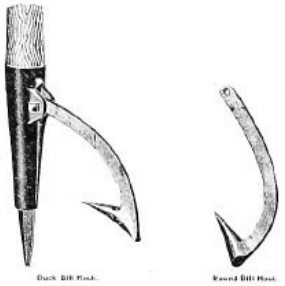
With Hard Maple Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 3—2¼ inch x 4, 4½ or 5 ft. handle	$32.50

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 4—2¼ inch x 4, 4½ or 5 ft. handle	$35.00

MALLEABLE IRON SOLID SOCKET PEAVIES.



Price List.

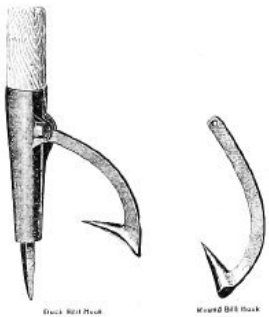
With Hard Maple Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 310—2½ inch x 4, 4½, 5 or 5½ ft. handles	$27.50
No. 311—2¼ inch x 4½, 5, 5½ or 6 ft. "	31.25
No. 312—3 inch x 5, 5½ or 6 ft. "	35.00

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 313—2½ inch x 4½, 5, 5½ or 6 ft. handles	$30.00
No. 314—2¾ inch x 4½, 5, 5½ or 6 ft. "	33.75
No. 315—3 inch x 5, 5½ or 6 ft. "	37.50

MALLEABLE IRON SPLIT SOCKET PEAVEY.



Price List.

With Hard Maple Handles and Round or Duck Bill Hooks.

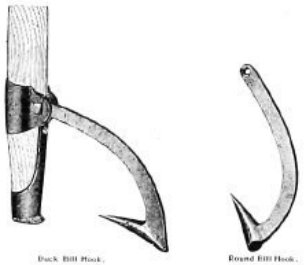
	Per Doz.
No. 10, 2½ inch x 4, 4½, 5, or 5½ ft. handles	$27.50
No. 11, 2¾ inch x 4½, 5, 5½ or 6 ft. handles	31.25
No. 12, 3 inch x 5, 5½ or 6 ft. handles	35.00

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 13, 2½ inch x 4½, 5, or 5½ ft. handles	$30.00
No. 14, 2¾ inch x 4½, 5, 5½ or 6 ft. handles	33.75
No. 15, 3 inch x 5, 5½ or 6 ft. handles	37.50

WROUGHT STEEL CLASP CANT HOOK.

With Long Toe Ring.



Price List.

With Hard Maple Handles and Round or Dúck Bill Hooks.

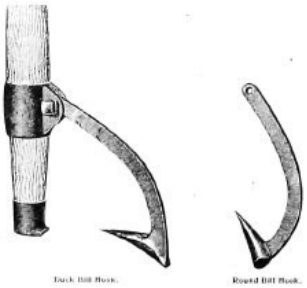
	Per Doz.
No. 130—2½ inch x 4, 4½ or 5 ft.	$25.00
No. 131—2¾ inch x 4½, 5, 5½ or 6 ft.	28.25
No. 132—3 inch x 5, 5½ or 6 ft.	31.25

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 133—2½ inch x 4, 4½ or 5 ft.	$27.50
No. 134—2¾ inch x 4½, 5, 5½ or 6 ft.	30.75
No. 135—3 inch x 5, 5½ or 6 ft.	33.75

MALLEABLE IRON CLASP CANT HOOK.

With Short Toe Ring.



Price List.

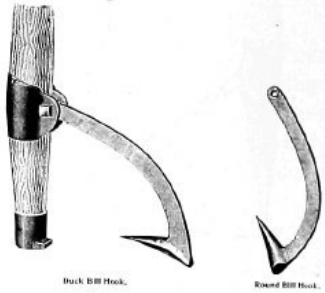
With Hard Maple Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 40—2½ inch x 4, 4½ or 5 ft. handles	$22.50
No. 41—2¾ inch x 4½, 5, 5½ or 6 ft. "	25.75
No. 42—3 inch x 5, 5½ or 6 ft. "	28.75

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 43—2½ inch x 4, 4½ or 5 ft. handles	$25.00
No. 44—2¾ inch x 4½, 5, 5½ or 6 ft. "	28.25
No. 45—3 inch x 5, 5½ or 6 ft. "	31.25

MILL CARRIAGE CANT HOOK.



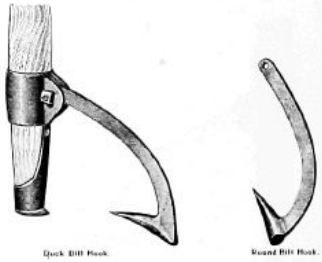
This tool is designed for use on saw carriages. It is made with Wrought Iron Clasp and Light Handle.

Price List.

	Per Doz.
No. 36—2¾ inch 3, 3½ or 4 ft Maple Handle	$25.00

MALLEABLE IRON CLASP CANT HOOKS

with Long Toe Ring.



Price List

With Hard Maple Handles and Round or Duck Bill Hooks.

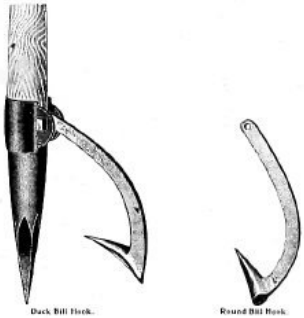
	Per Doz.
No. 140, 2½ inch x 4, 4½ or 5 ft. handles	$22.50
No. 141, 2¾ inch x 4½, 5, 5½ or 6 ft. handles	25.75
No. 142, 3 inch x 5, 5½ or 6 ft. handles	28.75

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 143, 2½ inch x 4, 4½ or 5 ft. handles	$25.00
No. 144, 2¾ inch x 4½, 5, 5½ or 6 ft. handles	28.25
No. 145, 3 inch x 5, 5½ or 6 ft. handles	31.25

"STRAIGHT FRONT" PEAVEY,

With Wrought Steel Socket and Clasp.



Duck Bill Hook. Round Bill Hook.

This Peavey has Socket and Pick in one piece, doing away with the shoulder at the end of socket.

Price List.

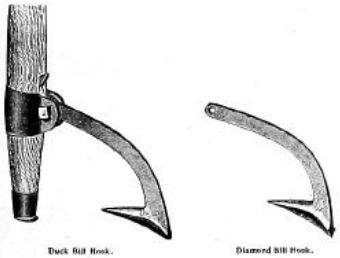
With Hard Maple Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 620—2½ inch x 4½, 5 or 5½ ft. handles	$34.00
No. 621—2⅝ inch x 4½, 5, 5½ or 6 ft. "	37.25
No. 622—3 inch x 5, 5½, or 6 ft. "	41.50

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 623—2½ inch x 4½, 5, or 5½ ft. handles	$36.50
No. 624—2⅝ inch x 4½, 5, 5½ or 6 ft. "	40.25
No. 625—3 inch x 5, 5½ or 6 ft. "	44.00

TOP LOADERS CANT HOOK.



Duck Bill Hook. Diamond Bill Hook.

This tool is designed especially for "Top Loaders" work. The hook is made of tool steel. Clasp is made of mild steel, extra heavy, and toe ring is made of steel. Hook is either duck bill or diamond bill, and is very heavy and strong in the head and throat. Handle is made of extra selected hard maple or hickory.

Price List.

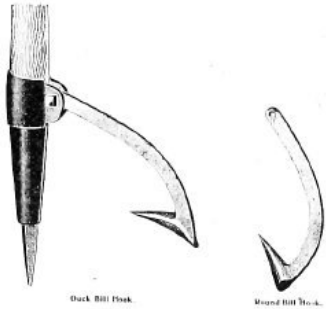
With Maple Handle.

	Per Doz.
No. 330—2½ inch x 4½ ft., Duck Bill Hook	$36.00
No. 331—2½ inch x 4½ ft., Diamond Bill Hook	39.00

With Hickory Handle.

	Per Doz.
No. 332—2½ inch x 4½ ft., Duck Bill Hook	$38.50
No. 333—2½ inch x 4½ ft., Diamond Bill Hook	38.50

WROUGHT STEEL SOCKET AND CLASP PEAVEY.



Duck Bill Hook. Round Bill Hook.

Price List.

With Hard Maple Handles and Round or Duck Bill Hooks.

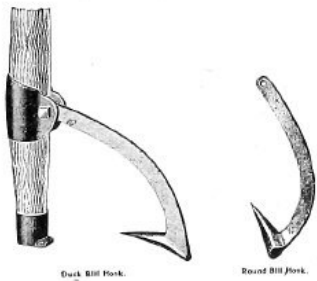
	Per Doz.
No. 20, 2½ inch x 4, 4½, 5 or 5½ ft. handles	$32.50
No. 21, 2⅝ inch x 4½, 5, 5½ or 6 ft. handles	36.25
No. 22, 3 inch x 5, 5½ or 6 ft. handles	40.00

With Hickory Handles Round or Duck Bill Hooks.

	Per Doz.
No. 23, 2½ inch x 4½, 5 or 5½ ft. handles	$33.00
No. 24, 2⅝ inch x 4½, 5, 5½ or 6 ft. handles	38.75
No. 25, 3 inch x 5, 5½ or 6 ft. handles	42.50

WROUGHT STEEL CLASP CANT HOOK,

With Short Toe Ring.



Duck Bill Hook. Round Bill Hook.

Price List.

With Hard Maple Handles and Round or Duck Bill Hooks.

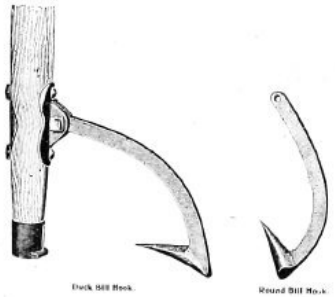
	Per Doz.
No. 30, 2½ inch x 4, 4½ or 5 ft.	$28.00
No. 31, 2⅝ inch x 4½, 5, 5½ or 6 ft.	31.25
No. 32, 3 inch x 5, 5½ or 6 ft.	34.50

With Hickory Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 33, 2½ inch x 4, 4½ or 5 ft.	$27.50
No. 34, 2⅝ inch x 4½, 5, 5½ or 6 ft.	30.75
No. 35, 3 inch x 5, 5½ or 6 ft.	33.75

MALLEABLE CLIP CANT HOOK.

With Half Oval Wear Iron on Front.



Price List.

With Hard Maple Handles and Round or Duck Bill Hooks.

	Per Doz.
No. 60—2½ inch x 4, 4½ or 5 ft. handles	$22.50
No. 61—2¾ inch x 4½, 5, 5½ or 6 ft. "	25.75
No. 62—3 inch x 5, 5½ or 6 ft. "	28.75

With Hickory Handles Round or Duck Bill Hooks.

	Per Doz.
No. 63—2½ inch x 4, 4½ or 5 ft. Handles	$25.00
No. 64—2¾ inch x 4½, 5, 5½ or 6 ft. "	28.25
No. 65—3 inch x 5, 5½ or 6 ft. "	31.25

PIKE POLES.

DESCRIPTION.

Handles are made from selected second growth Ohio White Ash.
Picks are hand forged of hammered crucible cast steel and are driven cold, but can be made to screw in if desired.
Ferrules are seamless and made of Norway Iron.

Price List.

With Curved Pike and Hook.

	Per Doz.
No. 80, Length of Pole 12 ft.	$23.75
No. 81, " " 14 ft.	27.00
No. 82, " " 16 ft.	30.75
No. 83, " " 18 ft.	40.00
No. 83½, " " 20 ft.	53.75

With Straight Pike and Hook.

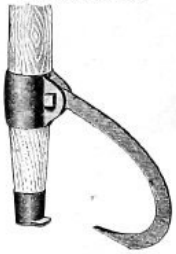
	Per Doz.
No. 84, Length of Pole 12 ft.	$23.75
No. 85, " " 14 ft.	27.00
No. 86, " " 16 ft.	30.75
No. 87, " " 18 ft.	40.00
No. 87½, " " 20 ft.	53.75

With Pike Only.

	Per Doz.
No. 88, Length of Pole 12 ft.	$20.00
No. 89, " " 14 ft.	23.25
No. 90, " " 16 ft.	25.00
No. 91, " " 18 ft.	36.25
No. 91½, " " 20 ft.	50.00

MALLEABLE CLASP CANT HOOK.

With Chisel Bill Hook.



Price List.

With Hard Maple Handles and Chisel Pointed Hooks.

	Per Doz.
No. 70—2½ inch x 4, 4½ or 5 ft. handles	$20.75
No. 71—2¾ inch x 4½, 5, 5½ or 6 ft. "	23.75
No. 72—3 inch x 5, 5½ or 6 ft. "	27.00

With Hickory Handles and Chisel Pointed Hooks.

	Per Doz.
No. 73—2½ inch x 4, 4½ or 5 ft. handles	$23.25
No. 74—2¾ inch x 4½, 5, 5½ or 6 ft. "	26.25
No. 25—3 inch x 5, 5½ or 6 ft. "	29.50

PICKAROONS,

For Handling Ties and Mill Refuse.

No. 100.—3 ft. Handle..... Per Dozen, $22.50

No. 101.—3 ft. Handle..... Per Dozen, $15.00

No. 102.—3 ft. Handle..... Per Dozen, $13.00

No. 103.—18 inch Handle..... Per Dozen, $12.00

SKIDDING TONGS.

Octagon Skidding Tong with Grab Hooks

Price List.

		Per Doz.
No. 110, 1	inch Octagon Steel with heavy upset heads and Grab Hook to open 28 in	$ 82.50
No. 111, 1¼	" " " " " " " "	90.00
No. 112, 1¼	" " " " " " " "	105.00
No. 113, 1¼	" " " " " and Ring "	32 in. 84.50
No. 114, 1½x⅝	inch Flat " " " and Grab Hook "	32 in. 90.00
No. 115, 1½x⅝	inch " " " " " "	38 in. 100.00
No. 116, 1⅝x⅜	inch " " " " " "	42 in. 150.00
No. 117, 2	x⅜ inch " " " " " "	54 in. 200.00
No. 118, 1⅜	inch Octagon " " " " " "	Prices quoted on application
No. 119, 1½	inch " " " " " "	
No. 120, 1¾	inch " " " " " "	

TIMBER CARRIERS OR LUG HOOKS.

For handling ties, telegraph poles or timbers. Will grapple material from 3 to 16 inches.

	Per Doz.
No. 127, 3, 3½ or 4 ft. handles	$30.00
No. 128, Clasps for same	12.50
No. 129, Handles for same	1.50

LOADING BLOCKS.

No. 124

No. 125

	Per Doz.
No. 124, Loading Block with swivel hook, steel shell	$27.50
No. 125, Loading Block with swivel hook and grabhook, steel shell	36.00
No. 126, Loading Block Sheaves	6.00

SWAMP HOOKS, ROLLWAY BREAKING HOOKS AND LOADING HOOKS.

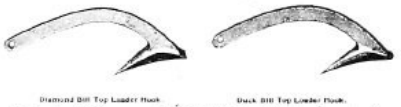
Square Swamp Hook. Octagon Swamp Hook. Rollway Breaking Hook. Square Loading Hook

Price List.

	Per Doz.
No. 120, Swamp Hook, 1 inch square	$30.00
No. 220, " " 1¼ inch "	37.50
No. 121, " " 1 inch Octagon	30.00
No. 221, " " 1¼ inch "	32.50
No. 321, " " 1½ inch "	37.50
No. 122 Rollway Breaking Hook, 1½x⅜ inch	37.50
No. 123, Loading Hook, ⅝ inch square	17.50

HOOKS ONLY FOR CANT HOOKS.

"Top Loaders" Hooks.



Diamond Bill Top Loader Hook. Duck Bill Top Loader Hook.

Top Loader Hooks are made of Tool Steel with extra heavy head and throat, after the most approved pattern.

	Per Doz.
No. 272—Diamond Bill Top Loaders Hook, 1x⅝ Steel	$24.00
No. 172—Duck " " " " "	24.00

REGULAR CANT HOOKS.

Duck Bill Hook. Round Bill Hook.

Price List.

		Per Doz.
No. 170—Cant Hook	Duck Bill 7x7-10 inch	$11.25
No. 171— "	" " 1 x7-10 inch	12.50
No. 172— "	" " 1 x½ inch	13.75
No. 172½ "	" " 1¼x½ inch	17.50
No. 370— "	Round " 7x7-10 inch	11.25
No. 371— "	" " 1 x7-10 inch	12.50
No. 372— "	" " 1 x½ inch	13.75

EXTRA PARTS FOR LOGGING TOOLS.

Wrought Cant Hook Clasp

Malleable Cant Hook Clasp

Price List.

	Per Doz.
No. 173, Wrought Steel Clasps 2½ inch	$ 7.50
No. 174, " " " 2¾ inch	8.25
No. 175, " " " 3 inch	9.50
No. 176, Malleable Iron " 2½ inch	5.00
No. 177, " " " 2¾ inch	5.75
No. 178, " " " 3 inch	7.00
No. 181, " " Cant Hook Clips, all sizes	3.25
No. 182, " " Peavey Sockets 2½ inch	10.00
No. 183, " " " " 2¾ inch	11.25
No. 184, " " " " 3 inch	12.50
No. 185, Wrought Steel Peavy Socket 2½ inch	10.00
No. 186, " " " " 2¾ inch	11.25
No. 187, " " " " 3 inch	12.50
No. 188, Malleable Iron Toe Rings	1.50
No. 189, Peavey Picks for 2½ inch Tools	7.50
No. 190, " " 2¾ inch Tools	8.50
No. 191, " " 3 inch Tools	9.50
No. 192, Pike Pole Pikes, Curved Pike and Hook	10.00
No. 193, " " Straight "	10.00
No. 194, " " without Hook	6.25
No. 195, " " Ferrules Seamless	1.50

Cant Hook Bolt.

	Per 100
No. 196, Steel Cant Hook Bolts, 7-16x1½ inch	$ 5.00
No. 197, " " " 7-16x1¾ inch	5.00
No. 198, " " " 7-16x2 inch	5.25

COLD SHUTS.

Price List.

	Soft Steel	Norway
No. 150, for ¼ inch Chain, per 100	$ 3.80	$ 4.50
No. 151, for 5-16 " "	4.10	4.88
No. 152, for ⅜ " "	4.15	5.10
No. 153, for 7-16 " "	4.85	6.00
No. 154, for ½ " "	5.40	7.00
No. 155, for 9-16 " "	8.45	11.25
No. 156, for ⅝ " "	12.40	17.00

For price larger Cold Shuts see Page 28

FID HOOKS.

1½ x ½ inch Plain

1¾ inch Half Round with Link

	Per Doz.
No. 165, 1½ x ½ inch Fid Hooks, plain	$5.00
No. 265, " " " with end link	5.50
No. 365, 1¾ inch, ½ round Fid Hooks, plain	5.00
No. 465, 1¾ inch, ½ round Fid Hook with end link	5.50

CHAIN HOOKS.

Round Chain Hook.

Price List.

	Per 100
No. 130—For ¼ inch Chain	$11.50
No. 131—For 5-16 "	14.50
No. 132—For ⅜ "	16.00
No. 133—For 7-16 "	19.00
No. 134—For ½ "	21.00
No. 135—For ⅝ "	31.50
No. 136—For ¾ "	40.00
No. 137—For 1 "	70.00

Larger Hooks Quoted on Application.

Grab Chain Hook

Price List.

	Per 100
No. 140—For ¼ inch Chain	$11.50
No. 141—For 5-16 "	14.50
No. 142—For ⅜ "	16.00
No. 143—For 7-16 "	19.00
No. 144—For ½ "	21.00
No. 145—For ⅝ "	31.50
No. 146—For ¾ "	40.00
No. 147—For 1 "	70.00

CANT HOOK AND PEAVEY HANDLES.

Hard Maple Handles, Extra Selected and Finished.

Length	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
No. 200, 2½ inch, per dozen,	$4.00	$4.00	$4.30	$4.60	$5.00
No. 201, 2¾ inch, "		4.60	4.90	5.20	5.60
No. 202, 3 inch, "			5.50	5.80	6.20

Selected.

Length	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
No. 203, 2½ inch, per dozen,	$3.00	$3.00	$3.30	$3.60	$4.00
No. 204, 2¾ inch, "		3.60	3.90	4.20	4.60
No. 205, 3 inch, "			4.50	4.80	5.20

Hickory Handles, Extra Selected, Finished and Oiled.

Length	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
No. 210, 2½ inch, per dozen,	$5.00	$5.00	$5.30	$5.60	$5.00
No. 211, 2¾ inch, "		5.60	5.90	6.20	6.80
No. 212, 3 inch, "			6.50	6.80	7.40

Selected and Oiled.

Length	4 ft.	4½ ft.	5 ft.	5½ ft.	6 ft.
No. 213, 2½ inch, per dozen,	$4.00	$4.00	$4.30	$4.60	$4.90
No. 214, 2¾ inch, "		4.60	4.90	5.20	5.80
No. 215, 3 inch, "			5.50	5.80	6.40

For boring handles add 25c per dozen net.

Pike Poles Without Irons.

Our Pike Poles are made from selected second growth Ohio White Ash Timber and quality of same cannot be excelled.

	Per Doz.
No. 220, 12 ft. Selected White Ash Pike Poles	$11.25
No. 221, 14 ft. " " "	13.75
No. 222, 16 ft. " " "	17.50
No. 223, 18 ft. " " "	25.00
No. 224, 20 ft. " " "	37.50

HOOKS.

Cotton Hooks. Hay Hooks. Freight Hooks.

	Cotton Hooks.	Freight Hooks.	Hay Hooks.
Size, 4 inches............per doz.,	$2 70	$2.70	......
" 5 " .... "	2.70	2 70	$2.70
" 6 " .... "	2.70	3 00	2.90
" 7 " .... "	3.00	3.50	3.20
" 8 " .... "	3.10	4.00	3.60
" 9 " .... "	3.25	.....	4.00
" 10 " .... "	4.00	.....	.....
" 12 " .... "	4.90	.....	.....

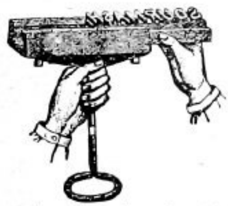
STEEL LOG MARKING STAMPS.

For marking the ends of logs.
Made of fine tool steel

With ¾-inch letters or figures,	$0.75	per letter or figure
" 1 " " "	1.00	" "
" 1¼ " " "	1.25	" "
" 1½ " " "	1.50	" "

Add 50 cents per lb. for forging.

ADJUSTABLE BURNING BRANDS.



Size inches........	¼	⅜	½	¾	1	1¼
Brand of 4 letters,	$1.00	1.00	1.00	2.00	2.30	2.50
" " 6 "	1.30	1.40	1.50	2.75	3.20	3.50
" " 8 "	1.60	1.80	2.00	4.00	4.10	4.50
" " 10 "	1.90	2.20	2.50	4.75	5.00	5.50
" " 12 "	2.20	2.60	3.00	5.25	5.90	6.50
" " 14 "	2.50	3.30	3.50	5.75	6.80	7.50

FORGED STEEL BOOT CALKS.

For Log Drivers.

Nos. 000, 00, 0, 1, 2, all Calks............per 1,000, $....
Nos. 3 and 4, Heel Calks............ .. " 1,000 ....
Nos. 000 to 2 packed 100 in box, 1,000 in package.
Nos. 3 and 4 " 50 " " 500 " "

CALK SETS AND SET AND PUNCH COMBINED.

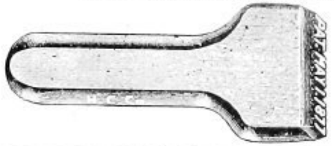
For setting all kinds of calks.

Boot calk sets............................per doz., $...
" " " and punch. .... " ...

STEEL STAMPS, LETTERS AND FIGURES.

Hand Made.

For stamping tools, wood, iron, steel and metals of all kinds. Made of the best English steel and warranted.



Size.	Figures, per Set.	Alphabet, per Set.	Steel Stamps, per Letter
1/32	$2.50	$ 7.50	$0.30
1/24	2.00	6.00	.25
1/20	1.75	5.25	.20
1/16	1.50	4.50	.15
1/12	1.50	4.50	.15
3/32	1.50	4.50	.15
1/10	1.50	4.50	.15
⅛	1.50	4.50	.15
5/32	1.75	5.25	.18
3/16	2.00	6.00	.20
7/32	2.25	6.75	.25
¼	2.50	7.50	.30
5/16	3.00	9.00	.35
⅜	3.50	10.50	.45
7/16	4.50	13.50	.55
½	5.00	15.00	.60
⅝	6.00	18.00	.75
¾	7.50	22.50	.85
1	9.00	27.00	1.00

STENCILS.

Made of Brass.

We can furnish these stencils of all sizes and any shape desired.

Prices quoted upon application.

TIN MARKING POTS.

	Per doz.	Each
Medium, 1½ pints,	$4.00	$0.35
Large, 2½ pints, ...	4.50	.40

STENCIL BRUSHES.

No.	Diameter, inches.	Price Each.	Price per Dozen.
1	9/16	$0.15	$ 2.20
2	11/16	.15	2.50
3	¾	.20	2.80
4	⅞	.20	3.10
5	1	.25	3.50
6	1¼	.30	4.00
7	1¼	.35	5.00
8	1⅜	.40	6.00
10	1½	.50	8.00
12	1⅞	.60	12.50
14	2	.75	17.00

STENCIL INK.

Furnished in black, blue and white, red, green and yellow.

RAFTING DOGS.

CHAIN DOG.
Style A.

RING DOG.
Style B.

RING DOG.
Style C.

RING DOG.
Style D.

RING DOG.
No. 14.

CHAIN DOGS, STYLE A.

No.	Size Chain.	Size Dog.	Est. Weight 100 Dogs.	Price.
1	5/16x 5 link (3 short center links)	1⅛x⅜ in.	215 lbs.	Per lb., $
2	5/16x 7 " (5 " " ")	1⅛x⅜ "	235 "	"
3	⅜ x 5 " (3 " " ")	1¼x⅜ "	267 "	"
4	⅜ x 7 " (5 " " ")	1¼x⅜ "	298 "	"
5	⅜ x14 " (12 " " ")	1½x⅜ "	475 "	"

RING DOGS. (Flat Pattern Dogs.) STYLE B. & C.

No.	Size Ring.	Size Dog.	Est. Weight 100 Dogs.	Price.
6	3x⅜ inch, style B.....	1¼x⅜ in.	100 lbs.	Per lb., $
7	3x⅜ " " B.....	1½x⅜ "	115 "	"
8	3x½ " " B.....	1½x⅜ "	131 "	"
9	3x½ " " B.....	1½x½ "	185 "	"
10	9/16 " oval (Norfolk pattern) style C..	2 x½ "	238 "	Each,

RING DOGS. (Square Pattern Dogs.) STYLE D.

No.	Size Ring.	Size Dog.	Est. Weight 100 Dogs.	Price.
11	½x3 inch, style D.....	¾ in. sqr. x6 in.	125 lbs.	Per lb., $
12	9/16x3 " " D.....	⅞ " " x6 "	160 "	"
13	⅝x3 " " D.....	1 " " x6 "	210 "	"
14	½x3¾ " iron, spear point.....	⅜x1½ x6 "		"

COIL OR CABLE CHAIN—CLOSE LINK.
Self-Colored or Black.

PROOF TESTS ADOPTED NOVEMBER 11, 1896

Size.	Proof Lbs.	BB Crane Lbs	BBB X. Crane In Lbs	Average Weight Per Foot. Lbs
3/16	700	770	900	.5
1/4	1,200	1,320	1,500	9
5/16	2,500	2,750	3,200	1 22
3/8	3,300	3,850	4,425	1.6
7/16	4,800	5,280	6,100	2 0
1/2	6,200	6,820	7,850	2.5
9/16	7,800	8,580	9,870	3.2
5/8	9,600	10,560	12,150	4.2
11/16	11,600	12,650	14,550	5.0
3/4	13,800	15,180	17,475	5.9
13/16	16,200	17,820	20,500	6.7
7/8	18,800	20,680	23,780	7.9
15/16	21,500	23,650	27,200	9 0
1	24,600	27,100	31,200	10.2
1 1/16	26,300	28,930	33,300	11 4
1 1/8	29,500	32,450	37,300	12.7
1 3/16	33,000	36,300	41,750	14 2
1 1/4	36,500	40,150	46,175	15 8
1 5/16	40,000	44,000	50,600	17.2
1 3/8	44,000	48,400	55,660	18.8
1 7/16	48,200	53 000	60,950	20 4
1 1/2	52,500	57,750	66,400	22.2
1 5/8	57,000	62,700	72,100	24 0
1 3/4	61.700	67,870	78,050	26.7
1 7/8	66,500	73,150	84,120	28.5
1 7/8	71.600	78,760	90,575	31.0

COIL, NORWAY CHAINS, to order

PRICES QUOTED ON APPLICATION.

Safe working load should be about one-half of proof test.

The breaking strain is about double the proof test.

GERMAN BRIGHT COIL CHAIN.

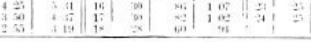
Nos.	6-0	5-0	4-0	3-0	2-0	0	1	2	3	4	5	6 to 8
Per 100 ft.	$18 00	15 50	13 00	11 00	10 00	8 80	7 80	7 20	6 80	6 60	6 50	6 50

JACK CHAIN

PRICE PER PACKAGE OF 12 YARDS

Single.

No.	Iron	Brass	Nickl'd or Silver'd	No	Iron	Brass	Nickl'd or Silver'd	No	Iron	Brass	Nickl'd or Silver'd
5	$4 60	$10 00	$12 50	12	$0 41	$2 05	$2 56	19	$0 27	$0 34	$0 67
6	1 30	8 00	10 00	13	42	1 50	2 12	20	26	50	62
7	1 05	6 35	7 94	14	40	1 45	1 69	21	25	45	56
8	95	5 25	6 56	15	45	1 00	1 25	22	25	40	50
9	90	4 25	5 31	16	39	86	1 07	23	25	40	50
10	80	3 50	4 37	17	39	82	1 02	24	25	40	50
11	55	2 53	3 19	18	28	60	94				



Double

No.	Iron	Brass	Nickl'd or Silver'd	No	Iron	Brass	Nickl'd or Silver'd	No	Iron	Brass	Nickl'd or Silver'd
10	$0 95	$4 25	$5 31	15	$0 43	$1 20	$1 87	20	$0 33	$0 62	$0 77
11	75	3 15	4 31	16	38	1 20	1 50	21	33	60	75
12	65	3 00	3 75	17	34	1 00	1 25	22	33	60	75
13	60	2 15	2 69	18	33	95	1 19	23	33	60	75
14	55	1 90	2 37	19	33	85	1 06	24	33	60	75

SAFETY CHAIN.

PRICE PER BOX OF 12 YARDS

No.	Brass	Nickel'd	Silvered	No.	Brass	Nickeled	Silvered
000	$1 45	$1 25	$1 25	2	$2 30	$2 40	$2 40
00	1 25	1 45	1 35	3	1 45	3 50	3 50
0	1 50	1 60	1 60	4	3 05	3 80	3 80
1	1 85	1 95	1 95				

RAFTING CHAIN

STYLE A

STYLE B

STYLE C

Usual sizes—5-8, 3-4, 7-8, 1 inch.

Made any length desired.

BRIGHT CLOSE TWISTED LINK MACHINE CHAIN

NUMBER	0	1	2	3
Size, inch	11-64	10-64	9-64	8-64
Price per 100 feet				

BRIGHT TWIST LINK COIL CHAIN

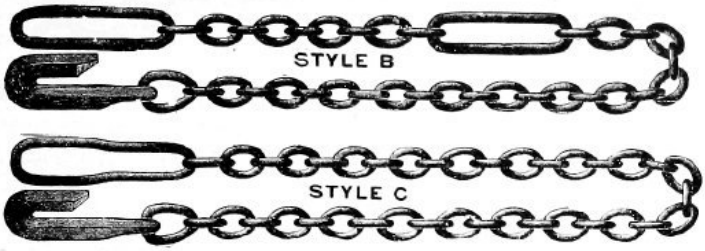
NUMBER	0	1	2	3
Size, inch	11-64	10-64	9-64	8-64
Price per 100 feet				

NO. 110. COIL LOG OR BINDING CHAIN.

CLOSE LINK

SIZE IRON	1-4	5-16	3-8	7-16	1-2	5-8
Self-Colored, per Pound						
Polished, per Pound						

RAILROAD SWITCH, OR WRECKING CHAIN



Usual Sizes— 5-8, 3-4, 7-8, 1 inch.

Made any length desired.

WAGON STRETCHER, OR SPREADER CHAINS

SIZE WIRE—INCH	1-4	5-16	3-8

Regular length is 60 inches from end to end of Chain when in position as shown in cut.

WAGON STAY CHAINS

SIZE WIRE—INCH	1-4	5-16	3-8

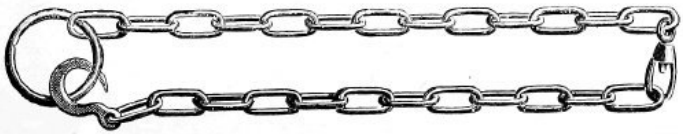
Regular length is 26 inches. Will make any length desired.

WAGON LOCK CHAINS

SIZE WIRE—INCH	1-4	5-16	3-8

Regular length is 42 inches. We will make them any length desired.

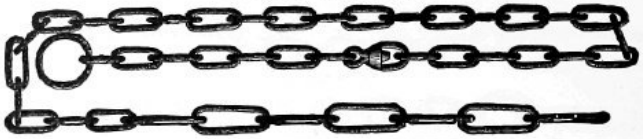
No. 100. LONG LINK LOG, OR OX CHAIN



SIZE IRON	1-4	5-16	3-8	7-16	1-2	5-8
Polished, per pound						

Regular lengths, 12 to 14 feet, will be sent, unless otherwise specified in order.

LONG TRACES



WESTERN REGULAR PATTERN TRACES	PRICE PER PAIR	
	6½ Feet Long	7 Feet Long
6 Links per foot, No. 3 Wire		
8 " " No. 3 "		
10 " " No. 3 "		

Number Wire Gauge—	0	1	2	3
Diameter Wire Inch—	5-16	9-32	1-4	7-32

CHAIN SHACKLES.

Wrought Iron.

Screw. Pin.

Size, inches.	Screw Shackles. Galvanized, Price per Dozen.	Screw Shackles. Blacked, Price per Dozen.	Pin Shackles. Galvanized, Price per Dozen.	Pin Shackles. Blacked, Price per Dozen.
⅝	$ 5.75	$ 5.00	$ 5.50	$ 4.75
¾	6.75	5.50	6.50	5.50
⅞	8.75	7.00	8.70	7.25
1	13.00	10.00	14.00	11.00
1⅛	20.00	16.00	19.00	15.00
1¼	25.00	20.00	25.00	20.00

1⅜ inch and larger, galvanized, 20c; blacked, 16c per lb.

HEART SHACKLES.

Galvanized Wrought Iron.

Size, inches.	Price, doz.	Size, inches.	Price, doz.
¼	$6.00	½	$ 8.50
⅜	6.25	⅝	9.50
⅜	6.50	⅝	11.50
⅞	7.50	...	.....

ANCHOR SHACKLES.

Wrought Iron.

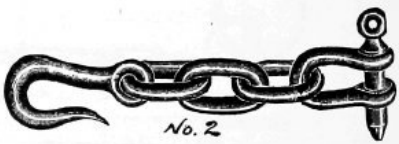
Screw. Pin.

Size, inch.	Screw Shackles. Galvanized, Price per Dozen.	Screw Shackles. Blacked, Price per Dozen.	Pin Shackles. Galvanized, Price per Dozen.	Pin Shackles. Blacked, Price per Dozen.
¼	$3.00	$2.75	$2.75	$2.50
⅜	3.00	2.75	2.75	2.50
⅜	3.25	3.00	3.00	2.75
⅞	3.75	3.50	3.65	3.40
½	4.50	4.00	4.25	3.75
⅝	5.00	4.50	4.75	4.25

1⅜ inch and larger, galvanized, 20c; blacked, 16c per lb.

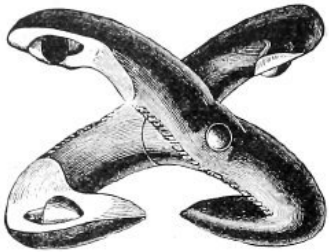
CHAIN AND CLEVIS HITCHINGS.

For Mine Cars.



Made from high grade XXX iron only. Standard size, 1⅛ inch clevis, ⅞ inch links. We furnish both larger and smaller sizes.

The "Keystone" Connecting Link



PRICE LIST "KEYSTONE" CONNECTING CHAIN LINKS

	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	3/4"	1"		Size
Forge Finish	$2.00	$2.25	$2.50	$3.25	$4.00	$7.50	$10.00	$15.00		Per Dozen
Electro-Galvanized	2.25	2 75	3.25	4.00	5.00	9 00	12.00	18.00		Per Dozen

Sizes up to 1/2" packed one dozen in a box, or shipped in bulk if desired.

The "Keystone Safety Shackle- Hook

CLOSE FITTING

PRICE LIST

SIZE.	FOR BLOCKS.	FOR WIRE ROPE.	PRICE.
1 inch	7" to 9"	3/8" to 1/4"	$3 00
1 3/8 "	10" to 12"	7/8" to 1 1/8"	5 00
1 5/8 "	13" to 15"	1 1/8" to 1 3/8"	7 50

Standard Hoist Hooks

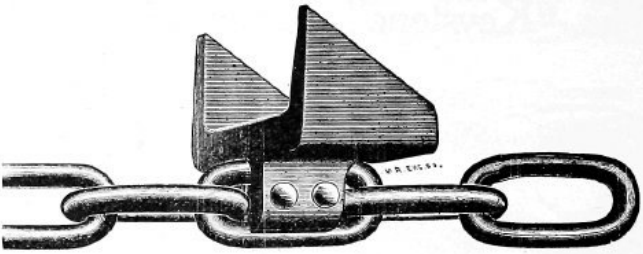
DROP FORGED FROM BAR STEEL

Superior in Strength, Design and Finish

PRICE LIST

Number	Capacity	Price Each Straight Shank	Price Each Eye Shank
000	500 lbs.	$0 12	$0 12
00	750 "	15	15
0	1,000 "	21	21
1	1,500 "	27	27
2	2,000 "	37	37
3	3,000 "	50	50
4	4,000 "	70	70
6	6,000 "	95	95
8	8,000 "	1 25	1 25
10	10,000 "	1 65	1 65

STANDARD WROUGHT IRON SPECIAL SPACED CABLE CRANE CHAIN.



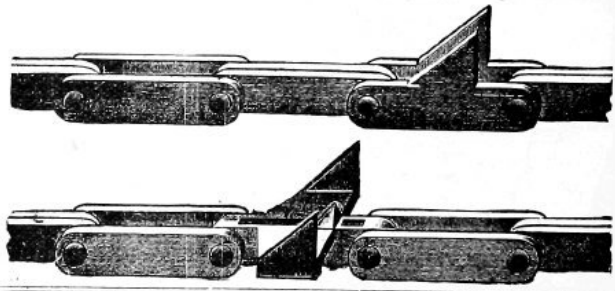
SECTION OF CABLE CRANE CHAIN WITH CHILLED LOG DOG.

Size of Chain, Inches.	Weight per Foot, Approximately.	Inside Length Link, Inches.	Breaking Strain, Pounds.
½	2.25	5	15,000
⅝	2.75	5	24,000
¾	3.85	6	34,000
⅞	5.75	5	46,000
⅞	5.50	6	46,000
1	8.50	5	58,000
1	7.87	6	58,000
1⅛	10.00	7	72,000
1¼	13.25	7	88,000
1⅜	14.75	8	104,000
1½	17.50	8	124,000

CAST IRON DOGS, CHILLED FACE.

For ⅝" chain, weight, each, 12 lbs.
For ¾" or ⅞" chain, weight, each, 26 lbs.
For 1⅛" or 1¼" chain, weight, each, 29 lbs

STEEL LOG HAUL-UP CHAINS.



Size.	Side Links.	Center Links.	Rivets.	Pitch.	Weight per Foot.
Medium.	⅝ x 1⅜	¾ x 2¼	¾ x 4	8	9.40
Heavy.	¾ x 2	⅞ x 2¼	⅞ x 4½	8	11.25

LEATHER BELTING.

ROYAL EXTRA BRAND.

Our ROYAL EXTRA brand of Belting is cut from centers of best and heaviest oak-tanned belting hides. The leather is tanned by the long-time process, which insures toughness. It is a strictly short-lap Belt and as good as can possibly be made.

All of our best Belting is center stock, cut from the heaviest of our Dixie Oak Belting Butts, strictly short-lap.

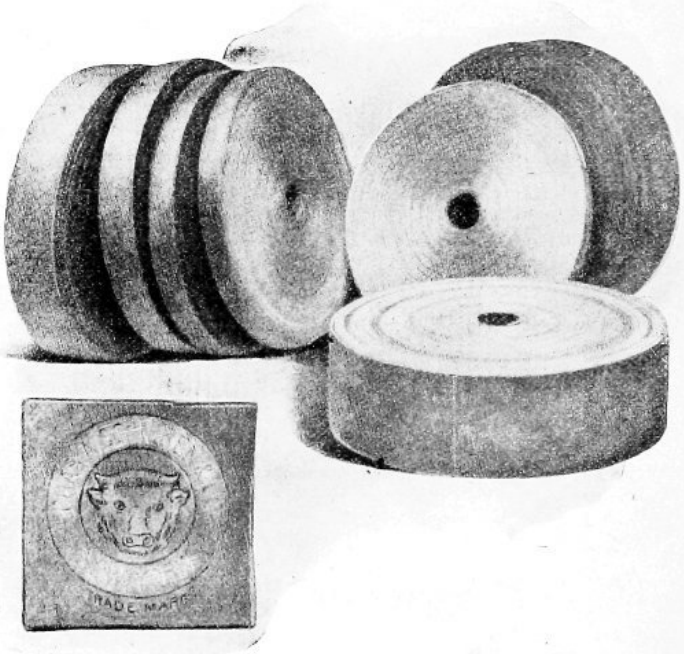
All shoulder or flanky leather is eliminated.

Our leather is pure oak-bark tanned, by the long-time process.

The Belting runs straight and true where pulleys and shafting are in line, and Belts are properly placed on the pulleys.

If at any time defects are found in the quality or workmanship of our Belting, we agree to replace same to purchaser without cost.

LEATHER BELTING.

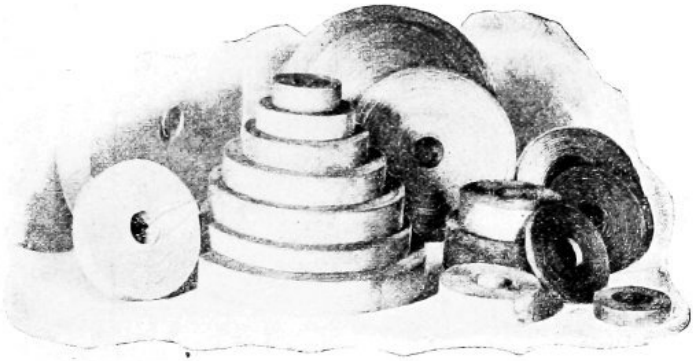


BULL'S HEAD BRAND.

Our BULL'S HEAD brand of Belting is cut from best oak-tanned belting hides, first quality of leather, as we use but one tannage, and that our own. It is a strictly short-lap Belt of regular weight.

We start with the hide. The best Packer Hide to be had, we tan with the purest oak bark that grows, by modern, economical methods and by special processes that add to the life and strength of the leather without adding to its cost; and we lay down on your factory floor, at a price no higher than the next best, a finished Belt that can not be bettered at any price.

LEATHER BELTING.



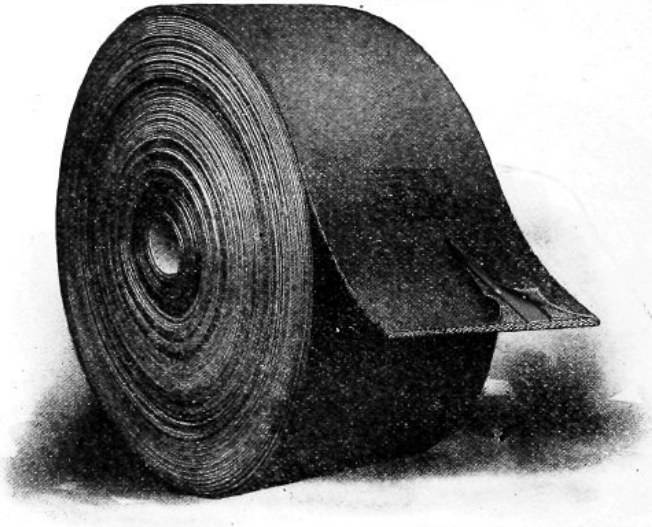
PRICE LIST OF BEST OAK-TANNED LEATHER BELTING.

Price per Running Foot Adopted November 12, 1901.

Width.	Price per Foot.	Width.	Price per Foot.	Width.	Price per Foot.	Width.	Price per Foot.
½ in.	$0 10	3¾ in.	$0 82	15 in.	$3 30	32 in.	$7 04
⅝ "	12	4 "	87	16 "	3 52	34 "	7 48
¾ "	14	4½ "	98	17 "	3 74	36 "	7 92
⅞ "	16	5 "	1 09	18 "	3 96	38 "	8 36
1 "	17	5½ "	1 21	19 "	4 18	40 "	8 80
1¼ "	23	6 "	1 32	20 "	4 40	44 "	9 68
1½ "	29	6½ "	1 43	21 "	4 62	48 "	10 56
1¾ "	35	7 "	1 54	22 "	4 84	52 "	11 44
2 "	41	8 "	1 76	23 "	5 06	56 "	12 32
2¼ "	47	9 "	1 98	24 "	5 28	60 "	13 20
2½ "	53	10 "	2 20	25 "	5 50	64 "	14 08
2¾ "	59	11 "	2 42	26 "	5 72	68 "	14 96
3 "	64	12 "	2 64	27 "	5 94	72 "	15 84
3¼ "	70	13 "	2 86	28 "	6 16		
3½ "	76	14 "	3 08	30 "	6 60		

Double Belts twice the price of single. Intermediate widths at proportionate prices. Extra heavy Belts, extra prices.

RUBBER BELTING.



"RED STRIP" BRAND RUBBER BELTING.

This is our LEADING BRAND of Belting, and is made with especially woven heavy duck, thoroughly stretched, put together with a high grade of friction between the piles, thoroughly forced into the duck, with a first-class cover over all, making an article suitable for severe work and satisfactory under all normal conditions.

A strip of red rubber is put under the lap, as shown above, which gives it its name. We stake our reputation on this Belt, and will replace any free of charge that gives out or fails to give satisfaction through any defects.

This is one of the oldest and best known brands of Belting on the market. During their manufacture our Belts are all thoroughly stretched by a patent process, making them as near as is possible free from stretch.

List page 328*a*.

PRICE LIST OF RUBBER BELTING.

Inch.	2 Ply per foot.	3 Ply per foot.	4 Ply per foot.	5 Ply per foot.	6 Ply per foot.	7 Ply per foot.	8 Ply per foot.
1	$0 07	$0 09	$0 11				
1¼	09	11	14				
1½	11	13	16	$0 19			
2	15	17	21	26	$0 31		
2½	18	22	26	32	39		
3	22	26	31	38	46		
3½	26	30	37	46	55		
4	30	34	42	52	63	$0 73	
4½	33	39	47	58	70	82	
5	36	43	52	65	78	91	
6	43	52	62	77	93	1 08	$1 24
7	51	60	73	91	1 09	1 27	1 46
8	59	70	84	1 05	1 26	1 47	1 68
9	67	80	95	1 18	1 42	1 66	1 90
10	75	90	1 07	1 33	1 60	1 87	2 14
11	83	1 00	1 18	1 47	1 77	2 06	2 36
12	91	1 08	1 30	1 62	1 95	2 27	2 60
13	1 00	1 18	1 42	1 77	2 13	2 48	2 84
14	1 08	1 28	1 54	1 92	2 31	2 69	3 08
15	1 16	1 38	1 66	2 07	2 49	2 90	3 32
16	1 25	1 50	1 78	2 22	2 67	3 11	3 56
18	1 41	1 70	2 02	2 52	3 03	3 53	4 04
20	1 58	1 90	2 26	2 82	3 39	3 95	4 52
22	1 76	2 12	2 52	3 15	3 78	4 41	5 04
24	1 96	2 36	2 80	3 50	4 20	4 90	5 60
26	2 15	2 60	3 08	3 85	4 62	5 39	6 16
28	2 35	2 84	3 36	4 20	5 04	5 88	6 72
30	2 55	3 10	3 64	4 55	5 46	6 37	7 28
32	2 75	3 35	3 92	4 90	5 88	6 86	7 84
34	2 95	3 60	4 20	5 25	6 30	7 35	8 40
36	3 15	3 85	4 48	5 60	6 72	7 84	8 96
38	3 35	4 10	4 76	5 95	7 14	8 33	9 52
40	3 55	4 35	5 04	6 30	7 56	8 82	10 08
42	3 75	4 60	5 32	6 65	7 98	9 31	10 64
44	3 95	4 85	5 60	7 00	8 40	9 80	11 20
46	4 15	5 10	5 88	7 35	8 82	10 29	11 76
48	4 35	5 35	6 16	7 70	9 24	10 78	12 32
50	....	....	6 44	8 05	9 66	11 27	12 88
52	....	....	6 72	8 40	10 08	11 76	13 44
54	....	....	7 00	8 75	10 50	12 25	14 00
56	....	....	7 28	9 10	10 92	12 74	14 56
58	....	....	7 56	9 45	11 34	13 23	15 12
60	....	....	7 84	9 80	11 76	13 72	15 68

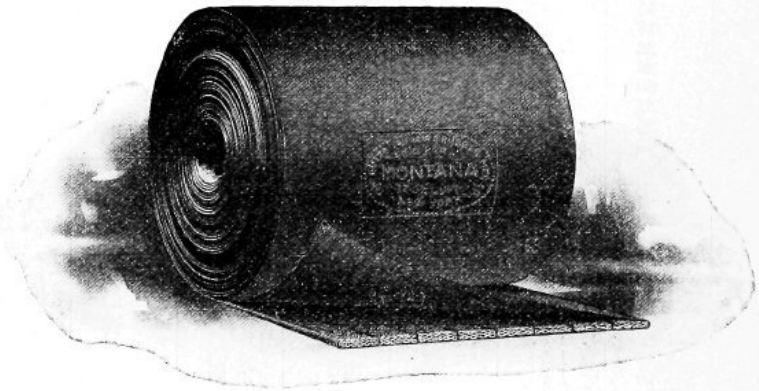
Intermediate widths at proportionate prices.

Regular or full size rolls contain 350 to 400 feet, but we cut or make to order any length desired.

Orders filled for usual sizes from stock. Special sizes made on three days' notice.

Endless Belts made to order, on which there will be three extra feet charged for the splice.

RUBBER BELTING.



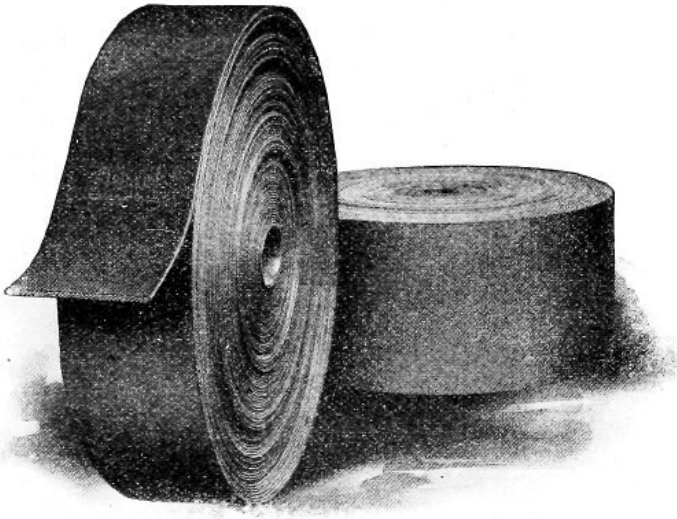
"MONTANA" STITCHED. OUR SAWMILL BELT.

The best of the stitched Belts, made of the heaviest duck and strongest friction; *thoroughly stretched in course of manufacture;* with a smooth, seamless cover; stitched closely and evenly with extra strong yarns and by the most approved and up-to-date machines.

Particularly adapted for use in sawmills, paper mills, and wherever a stitched belt is required.

List page 328a.

RUBBER BELTING.

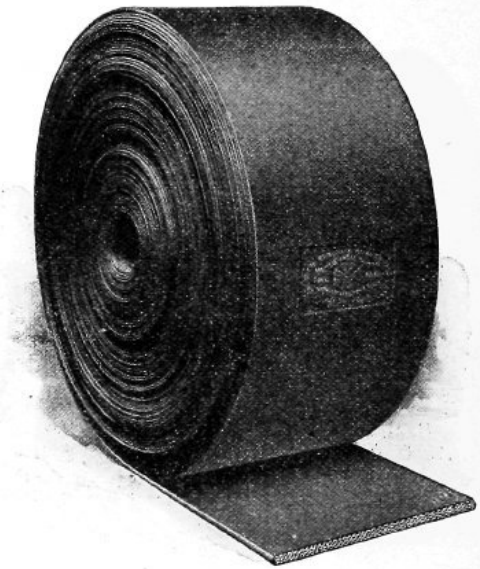


"MOHAWK" BRAND RUBBER BELTING.

This Belt is made on medium weight duck with a good grade of friction and cover, and is thoroughly well pressed and cured. It will be found a serviceable Belt for ordinary work, and fills a large demand for small elevators and mills.

List page 328a.

RUBBER BELTING.

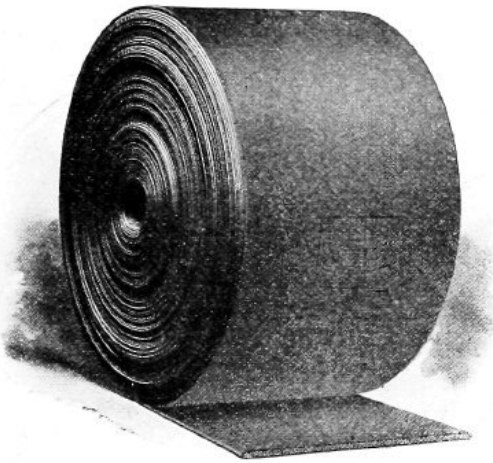


"MALTESE CROSS" BRAND RUBBER BELTING.

This is a special Belt of the highest grade, particularly adapted for use wherever a Belt of unusual strength and durability is required and suitable for hard places where difficulty is found in obtaining a satisfactory article. Made with a smooth, even cover on 32 ounce duck, with the plies strongly united with the best quality of rubber friction. A well pressed, compact Belt, uniform in width and thickness, thoroughly stretched in course of manufacture; in fact, made in the best possible manner of the best materials and with the greatest care.

List page 328a.

RUBBER BELTING.



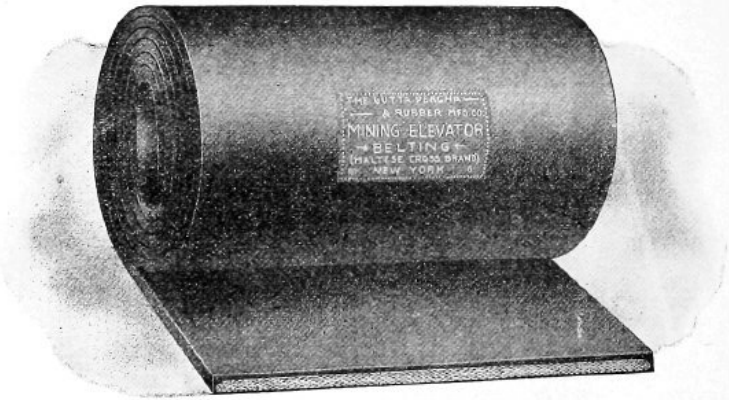
SPECIALLY CONSTRUCTED ELEVATOR BELTING.

This grade of Belting is made on 32 ounce duck, with a first-class friction, and hard, smooth cover, for use in grain elevators, etc. Only in wide Belts, from 14 inches to 72 inches.

We guarantee all of these Belts, and have them in the largest elevators in the country.

List page 328a.

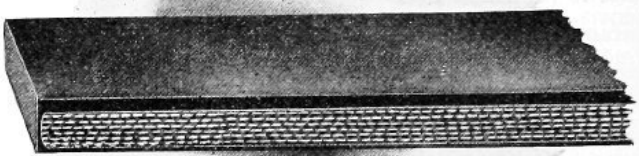
RUBBER BELTING.



MINING ELEVATOR BELT.

This Belt is carefully constructed of the heaviest belting duck, with best quality of rubber friction, and cover composed of the finest rubber. On the pulley side of this Belt is put a cover ⅛ inch thick, which forms a cushion to prevent the ore, etc., from cutting the duck and destroying the strength and life of the Belt. Adapted to wet or dry elevating.

List page 328a.



BELTING.

Price List Stitched Canvas Belting.

Adopted by Manufacturers' Association, Jan. 20, '04.

Width in inches.	4 Ply.	5 Ply.	6 Ply.	8 Ply.	10 Ply.
1	$0 10	.....	.....	.....	.....
1½	15	.....	.....	.....	.....
2	20	$0 25	$0 29	.....	.....
2½	25	31	36	.....	.....
3	30	38	44	.....	.....
3½	35	44	51	.....	.....
4	40	50	58	$0 76	.....
4½	45	56	65	85	.....
5	50	63	73	95	.....
6	60	75	87	1 14	.....
7	70	88	1 02	1 33	.....
8	80	1 00	1 16	1 52	.....
9	90	1 13	1 31	1 71	.....
10	1 00	1 25	1 45	1 90	.....
11	1 10	1 38	1 60	2 09	.....
12	1 20	1 50	1 74	2 28	$2 82
13	1 37	1 71	1 99	2 60	3 22
14	1 47	1 84	2 13	2 79	3 45
15	1 58	1 98	2 29	3 00	3 71
16	1 68	2 10	2 44	3 19	3 95
18	1 89	2 36	2 74	3 59	4 44
20	2 10	2 63	3 05	3 99	4 94
22	2 31	2 89	3 35	4 39	5 43
24	2 52	3 15	3 65	4 79	5 92
26	.....	.....	4 15	5 43	6 72
28	.....	.....	4 47	5 85	7 24
30	.....	.....	4 79	6 27	7 76
32	.....	.....	5 10	6 69	8 27
34	.....	.....	5 42	7 11	8 79
36	.....	.....	5 74	7 52	9 31
38	.....	.....	.....	7 94	9 82
40	.....	.....	.....	8 36	10 34
42	.....	.....	.....	9 58	11 84
44	.....	.....	.....	10 03	12 41
46	.....	.....	.....	10 49	12 97
48	.....	.....	.....	10 94	13 54

CARTON CANVAS STITCHED BELTING.

Is impervious to heat, cold, steam, gas or acid fumes; it can be used where leather and rubber are impracticable.

No Belt is so well adapted for *Endless Thresher Belts* as the CARTON-made endless. They will outwear two ordinary canvas or rubber thresher belts.

ENDLESS THRESHER BELTS.

For immediate shipment in the following sizes:

4 Ply.

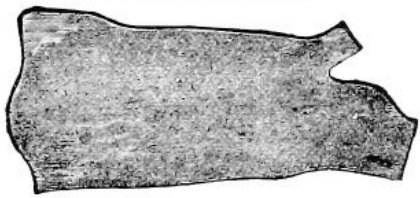
6 inch.	7 inch.	8 inch.
60 feet.	.....	70 feet.
80 "	80 feet.	80 "
100 "	100 "	100 "
120 "	120 "	120 "
130 "	130 "	130 "
140 "	140 "	140 "
150 "	150 "	150 "
160 "	160 "	160 "

Three feet extra charged for splice on Endless Belts other than Thresher Belts.

LACE LEATHER.

Rawhide Lace Leather.

Per square foot, $



Indian Tanned Lace Leather.

Per square foot, $

ROUND TWIST RAWHIDE BELTING.

CUT LACING.

Twist.

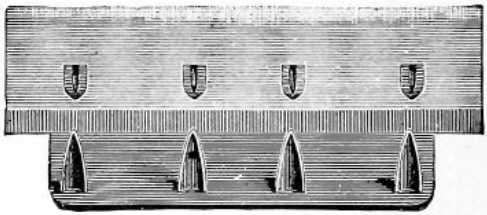
⅛	$0 06
3/16	10
¼	14
5/16	18
⅜	22
½	30
⅝	36
¾	46
⅞	60
1	70

Cut Lacing.

¼, per 100 ft.	$1 00
5/16 " "	1 25
⅜ " "	1 50
½ " "	2 00
⅝ " "	2 75
¾ " "	3 25

THE STANDARD BELT FASTENER.

MALLEABLE IRON.



PRICE LIST.

Single Leather.

No.		Per 100.
1.	For 1 inch belts	$1.50
2.	" 1¼ and 1½ inch belts	2 00
3.	" 1¾ " 2 " "	2.50
4.	" 2¼ " 2½ " "	3.00
5.	" 2¾ " 3 " "	3.50
6.	" 3¼ " 3½ " "	4.50
7.	" 3¾ " 4 " "	5.50

Extra Wide for Old Single Leather Belts and for Belts Wider Than 4 Inches.

3¼.	For 2 inch belts	$3.50
4½.	" 2½ " "	4.50
5½.	" 3 " "	5.50
6½.	" 3½ " "	6.50
7½.	" 4 " "	7.50

Double Leather.

8.	For 2 " "	$5.00
9.	" 2½ " "	6.50
10.	" 3 " "	7.50
11.	" 3½ " "	8.50
12.	" 4 " "	9.50

3-Ply Rubber.

17.	For 2½ inch belts.	$5.00
20.	" 3 " "	7.00
21.	" 4 " "	8.00

4-Ply Rubber.

12½.	For 1½ inch belts.	$4.00
13.	" 2 " "	5.00
14.	" 2½ " "	6.50
15.	" 3 " "	7.50
16.	" 4 " "	9.50

4-Ply Old Rubber.

18.	For 3 inch, extra wide	$10.00
19.	" 4 " " "	12.00

5 and 6-Ply Rubber.

21¼	For 2½ inch belts	$ 9.00
22.	" 3 " "	10.00
23.	" 4 " "	12.00

7 and 8-Ply Rubber.

24.	For 3 inch. extra wide	$12.00
25.	" 4 " " "	15.00
26.	" 4 " 8-ply, extra wide and heavy, for the largest and heaviest belt	25.00

BRISTOL'S STEEL BELT LACING

FOR LEATHER BELTS.

No. 00.	For Extra Light Belts, from 1-16 inch to ⅛ inch thick	Per box,	$1 00
" 0.	" Light Belts from ⅛ inch to 3-16 inch thick	"	1 00
" 1.	" Ordinary Single Leather Belts from 3-16 inch to ¼ inch thick	"	1 50
" 2.	" Extra Heavy and Wide Single Leather Belts from ¼ inch to 5-16 inch thick	"	2 00
" 3.	" Double Leather Belts from 5-16 inch to ⅜ inch thick	"	2 50
" 4.	" Heavy Double Leather Belts from ⅜ inch to 7-16 inch thick	"	3 00
" 5.	" Extra Heavy Double Leather Belts from 7-16 inch to 9-16 inch thick	"	3 50

FOR RUBBER, COTTON AND WOVEN BELTS.

No. 100.	For Lightest Rubber and Cotton Belts from 1-16 inch to ⅛ inch thick	Per box,	$1 10
" 10.	" 2-Ply Rubber and Cotton Belts from ⅛ inch to 3-16 inch thick	"	1 10
" 11.	" 3-Ply Rubber and Cotton Belts from 3-16 inch to ¼ inch thick	"	1 65
" 12.	" 4-Ply Rubber and Cotton Belts from ¼ inch to 5-16 inch thick	"	2 20
" 13.	" 5-Ply Rubber and Cotton Belts from 5-16 inch to ⅜ inch thick	"	2 75
" 14.	" 6-Ply Rubber and Cotton Belts from ⅜ inch to 7-16 inch thick	"	3 30
" 15.	" 7 and 8-Ply Rubber and Cotton Belts from 7-16 inch to 9-16 inch thick	"	3 85

All boxes packed with 100 inches of assorted lengths.

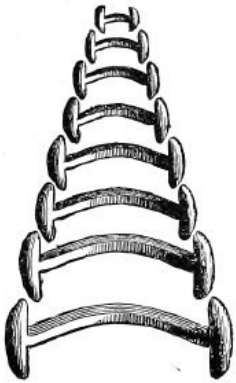
COE'S IMPROVED STEEL BELT HOOKS.

The zig-zag leaves the belt practically as strong at the usual breaking point as any other place in the belt. Made of cold rolled steel. It is better than lacing. Runs smooth at any rate of speed, and can be applied with a hammer. Made in three sizes each, assorted lengths for cotton, rubber or leather belts.

For Single Leather, 3-ply Rubber or Cotton Belts	No. 1, ⅜ to 4 inches wide, 100 in box, per box,	$1 20
" " and Light Double Leather 4-ply Rubber or Cotton Belts,	No. 2, 1 to 6 " " " " "	2 00
" Double Leather, 4 to 6-ply Rubber or Cotton Belts	No. 3, 1 inch wide and up, " " "	3 00

IMPROVED POINTED BELT HOOKS.

No. 16.	Per M	$2 00	No. 6.	Per M	$ 8 50
" 15.	"	2 00	" 5.	"	11 00
" 14.	"	2 40	" 4.	"	14 00
" 13.	"	2 60	" 3.	"	16 00
" 12.	"	2 80	" 2.	"	20 00
" 11.	"	3 00	" 1.	"	30 00
" 10.	"	3 50	2½ inch,	"	50 00
" 9.	"	4 00	3 "	"	60 00
" 8.	"	5 00	3½ "	"	70 00
" 7.	"	6 00	4 "	"	80 00



Improved Belt Studs.

For Either Leather or Rubber Belts.

No. 00 Largest	per 100	$2.50
No 0	"	2.00
No. 1	"	1.65
No. 2	"	1.25
No. 3	"	.90
No. 4	"	.80
No. 5	"	.70
No. 6	"	.60

Directions on each box.

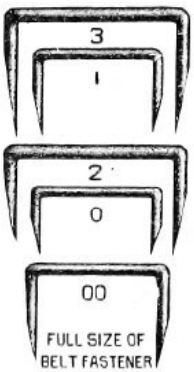
Awl and Pliers Combined.

For Blake's Studs, each		$ .40
Large Cutters	"	1.25
Small "	"	.90

STEEL BELT HOOKS

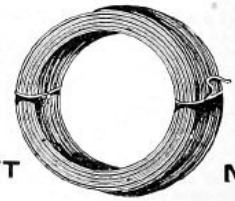
They are made in five sizes and are put up 200 in a box

No. 0 For single leather and light rubber belts.
No. 00 For double leather.
No. 1 For all belts less than 4-ply.
No. 2 From 4 to 6-ply.
No. 3 From 6 to 10-ply



Price per 1000, All Sizes $1.25

Composition Wire Belt Lace



THE L X COMPOSITION WIRE BELT LACE is made in four sizes and sold at $2.00 per hundred feet for all four sizes.

Each size is packed in boxes containing 50 feet, as follows:

No. 0. For belts from one inch to two and a-half inches.
No. 1. For single belts five inches and under.
No. 2. For all single belts wider than five inches; also for all double belts under eight inches.
No. 3. For all double belts above eight inches in width.

Combination Belt Cutter

CUTTER, AWL AND PLIERS IN ONE TOOL

PRICE $1.50 EACH

This is a tool of great convenience, a time saver, and does the work of two tools, heretofore required for this purpose. It is made of best material well finished and first class in every respect. It is a very useful tool and no one using a belt cutter should be without one of these.

RIVET SET AND HEADER.

Number	00	0	1	2	3	4	5	6	7	8
Size of Holes	5/32	9/32	11/64 in.	3/16	9/64	15/64	21/64	27/64	33/64	39 ga.
For Iron Rivets	14	10 & 12	8	6	4 & 5	2½ & 3	2	1½	1¼	12 oz.
For Copper Rivets	.....	5	6	7	8	9	10 & 11	12	13	14
Per dozen	$9.00	9.00	7.50	7.50	6.00	6.00	4.50	4.50	3.75	3.75

COPPER RIVETS AND BURRS.

Nos	7	8	9	10	11	12	13	14	15
Per Pound	$0.49	.50	.52	.54	.56	.58	.60	.65	.70

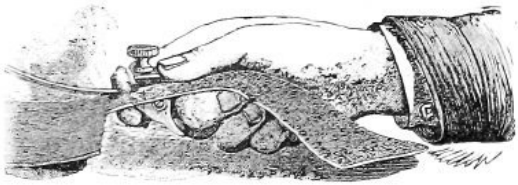
Belt and Hose Rivets are packed as follows: Rivets only in 4-lb. or 1-lb. paper boxes, and in solid cases of 100 lbs. Rivets and Burrs mixed (equal quantities of each), in 1-lb. or ½-lb. paper boxes, and in solid cases of 100 lbs. Also Rivets, assorted lengths, ⅜ to ¾ inch, with Burrs to match, in 1-lb. or ½-lb. paper boxes, and in solid cases of 100 lbs. For Rivets and Burrs in ½-lb. boxes, add one cent per lb. net.

CRESCENT BELT COUPLINGS.

Only made in the following sizes:

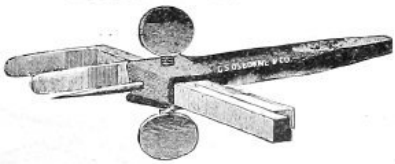
Size ..... Inches	1/16	¼	5/16	⅜	7/16	½	5/8	¾	⅞	1
Per dozen	$2.00	2.00	2.50	3.00	3.50	4.00	6.00	9.00	13.00	18.00

EMPIRE LACE CUTTER.



Price ..... Per dozen, $6.00

WASHER CUTTER.



Black Handle ..... Per dozen, $10.00

ROUND AND OVAL BELT PUNCHES.

		Round.	Oval.
Nos. 00, 0	Per dozen,	$4 00	.....
Nos. 1, 2, 3, 4, 5	"	2 00	$4 00
Nos. 6, 7, 8, 9	"	2 25	4 50
Nos. 10, 11, 12	"	2 50	5 00
Nos. 13, 14, 15, 16	"	6 00	12 00

One dozen in a box.

BELT AWLS.

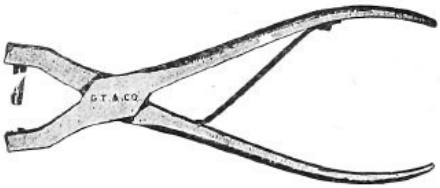
Belt Borer ..... Per dozen, $2.50

Belt Awls, with Eye for carrying Lacing through Hole ..... Price, per dozen, $2.00

LAWTHROP PATENT BELT AWLS.

Price ..... Per dozen, $6.00

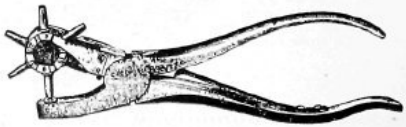
SPRING PUNCHES.



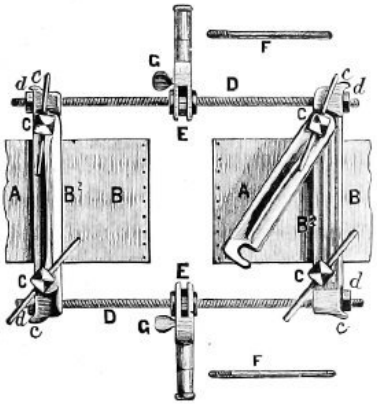
Plain Tubes	Per dozen,	$6.00
Screw "	"	8.00
Extra Plain Tubes	"	2.50
" Screw "	"	4.00

REVOLVING PUNCHES.

4 Tube	Per dozen,	$15.00
6 "	"	17.50
Extra Tubes for same	"	2.50



AINSWORTH'S STEEL BELT CLAMP.



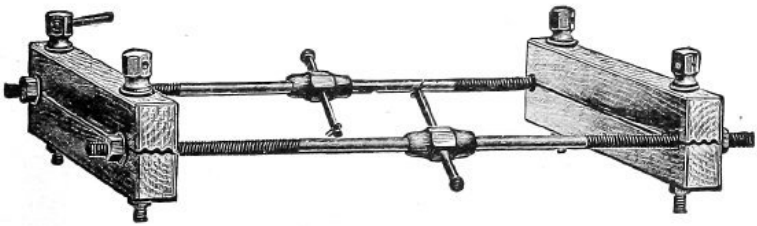
PRICE LIST.

Sizes.						Price.
8 inch,	length of	rods	3	feet	.....	$10 00
12 "	"	"	4	"	.....	12 00
16 "	"	"	4	"	.....	15 00
20 "	"	"	4	"	.....	18 00
24 "	"	"	4	"	.....	20 00
26 "	"	"	4	"	.....	22 00
30 "	"	"	4	"	.....	24 00
34 "	"	"	4	"	.....	26 00
36 "	"	"	4	"	.....	28 00
40 "	"	"	5	"	.....	30 00
44 "	"	"	5	"	.....	32 00
48 "	"	"	5	"	.....	34 00

EXPLANATION.

A and B, end of belt. B2 and B2 clamp bars with corrugation that acts like a vise in holding the belt from slipping through the clamp. Bars C and C at four corners, the bolts that hold clamps firmly together on the belt. D and D, rods with

IMPROVED BELT CLAMP



For 6 to 14 inch belt	..... each,	$10 00
" 12 " 18 " "	..... "	12 00
" 18 " 24 " "	..... "	14 00
" 24 " 36 " "	..... "	18 00

PEERLESS BELT LACER.

12 inch Machine.

PRICE LIST OF MACHINES.

4 inch (portable), for lacing single or double belts up to 4 inches wide, with 4,000 inches coil lacing..... $ 70 00

6 inch (on stand), for lacing single or double belts up to 6 inches wide, with 6,000 inches coil lacing..... 85 00

8 inch (on stand), for lacing single or double belts up to 8 inches wide, with 6,000 inches coil lacing..... 95 00

12 inch (on stand), for lacing single or double belts up to 12 inches wide, with 6,000 inches coil lacing..... 110 00

18 inch (on stand), for lacing single or double belts up to 18 inches wide, with 8,000 inches coil lacing..... 145 00

24 inch, for lacing single or double belts up to 24 inches wide, with 8,000 inches of coil lacing. 175 00

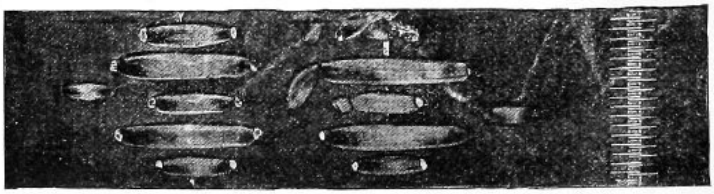
Power attachment, extra..... 14 00

With each machine is furnished in addition to the coil lacing, 2 dozen spiral needles, 500 inches rawhide pins, 1 ball twine, 1 pair cutting pliers, 1 file and handle, 1 threader and 1 needle holder.

For use in damp or wet places, furnish brass coil lacing in place of steel, but only one-half the quantity.

PRICE LIST OF SUPPLIES.

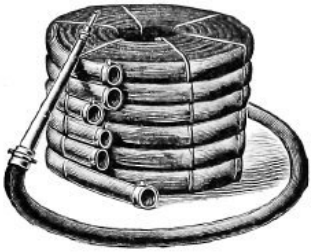
Coil Lacing, per box (containing 1,000 inches)	$1 50
Coil Lacing, brass, per box (containing 1,000 inches)	3 00
Spiral Needles, per doz.,	50
Rawhide Pins, per bundle (containing 1,000 inches)	3 00
Steel Pins (containing 1,000 inches),	75
Coupling Twine, per ball,	40
Cutting Pliers, per pair,	2 25



An Old Way. The New.

WRITE FOR FULL PARTICULARS.

WATER HOSE.



LIST.

Internal Diameter, inches.	Conducting Hose, 2 ply. Per foot.	Hydrant Hose 3 ply. Per foot.	Engine Hose 4 ply. Per foot.	Engine Hose 5 ply. Per foot.	Engine Hose 6 ply. Per foot.
½	$0 20	$0 25	$0 30	$0 37	$0 45
¾	25	30	37	46	55
1	33	40	50	62	75
1¼	42	50	62	77	93
1½	50	60	75	93	1 12
1¾	58	70	87	1 08	1 30
2	66	80	1 00	1 25	1 50
2¼	75	90	1 12	1 40	1 68
2½	83	1 00	1 25	1 56	1 87
2¾	92	1 10	1 37	1 71	2 05
3	99	1 20	1 50	1 87	2 25
4	1 32	1 60	2 00	2 50	3 00
5	1 65	2 00	2 50	3 13	3 75
6	1 98	2 40	3 00	3 75	4 50
7	2 31	2 80	3 50	4 38	5 25
8	2 64	3 20	4 00	5 00	6 00
9	2 97	3 60	4 50	5 63	6 75
10	3 33	4 00	5 00	6 25	7 50

Tank Hose for Railroads

Our special brands are Sphinx, Gulf and Moose.

Sphinx Hose is a seamless tube special weave of duck, durable and great friction.

Gulf is made same as Sphinx excepting lighter in weight; 15 per cent. less durability than Sphinx.

Moose possesses 30 per cent. of the strength and durability of Sphinx.

GARDEN HOSE.

W. A. Z. ½ inch, 3 ply ..... per foot, $

Zelnicker. ½ " 5 " ..... "

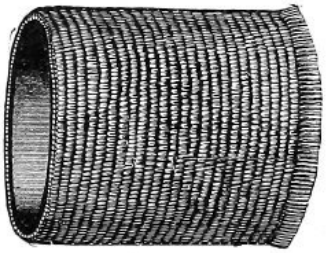
W. A. Z. ¾ " 3 " ..... "

Zelnicker. ¾ " 5 " ..... "

Sphinx. ¾ " 4 " ..... "

"ZELNICKER" RUBBER LINED COTTON MILL HOSE.

For Fire Protection in Factories, Mills, Etc.

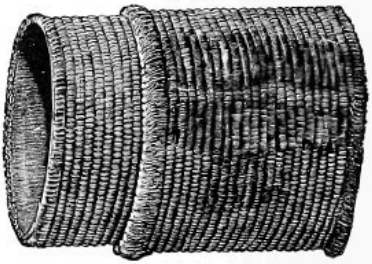


List of Rubber Lined Cotton Mill Hose.

Diameter	¾ inch	per foot,	$0 20
"	1 "	"	35
"	1¼ "	"	45
"	1½ "	"	55
"	2 "	"	60
"	2½ "	"	70
"	3 "	"	1 00

DOUBLE JACKET RUBBER LINED FIRE HOSE.

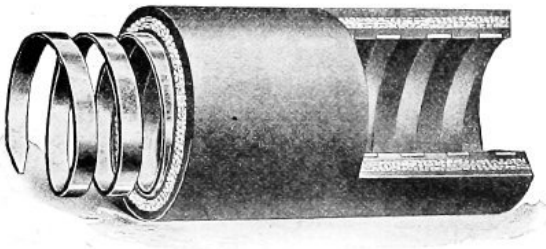
1½ inch	list, per foot,	$0 60
2 "	" "	80
2½ "	" "	1 00
3 "	" "	1 40
3½ "	" "	1 60



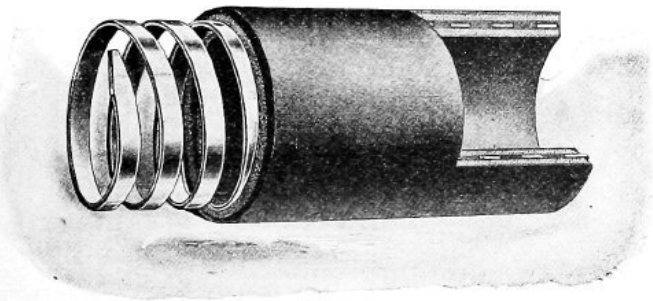
LINEN FIRE HOSE.

"Zelnicker,"	1 inch	per foot,	$0 24
"	1¼ "	"	27
"	1½ "	"	30
"	2 "	"	34
"	2¼ "	"	37
"	2½ "	"	40
"W. A. Z.,"	1 "	"	20
"	1¼ "	"	24
"	1½ "	"	28
"	2 "	"	30
"	2¼ "	"	34
"	2½ "	"	37

SUCTION HOSE.



¾ inch to 4 inches.



4 inches and above.

For Steam Fire Engines, Excavating, Mining, Wrecking and Sand Pumps.

LIST PRICES.

¾ inch	per foot,	$0	70
1 "	"		90
1¼ "	"	1	15
1½ "	"	1	50
1¾ "	"	1	90
2 "	"	2	30
2½ "	"	3	10
3 "	"	4	00
3½ "	"	4	90
4 "	"	5	80
4½ "	"	6	70
5 inches	per foot,	$ 7	60
5½ "	"	8	50
6 "	"	9	50
7 "	"	12	00
8 "	"	15	00
9 "	"	17	50
10 "	"	20	00
12 "	"	25	00
13 "	"	30	00
14 "	"	32	50

AGRICULTURAL SUCTION HOSE.

LIST PRICES.

1 inch	per foot,	$0	75
1¼ "	"		93
1½ "	"	1	13
1¾ "	"	1	31
2 inches	per foot,	$1	50
2¼ "	"	1	69
2½ "	"	1	88

TANK HOSE.

For Railroads.

Internal Diameter.	Per foot.	Internal Diameter.	Per foot.
3 inch, 2 ply	$0 99	7 inch, 2 ply	$2 31
4 " 2 "	1 32	8 " 2 "	2 64
5 " 2 "	1 65	9 " 2 "	2 97
6 " 2 "	1 98	10 " 2 "	3 33

STEAM HOSE.

LIST.

Internal Diameter.	3 Ply, per foot.	4 Ply, per foot.	5 Ply, per foot.	6 Ply, per foot.
½ inch	$0 43	$0 51	$0 63	$0 76
¾ "	51	67	83	1 00
1 "	67	83	1 03	1 24
1¼ "	85	1 04	1 30	1 56
1½ "	1 02	1 25	1 56	1 87
1¾ "	1 18	1 45	1 81	2 17
2 "	1 34	1 66	2 07	2 49
2¼ "	1 50	1 87	2 33	2 80
2½ "	1 66	2 03	2 60	3 12
3 "	2 00	2 80	3 50	4 20

To obtain price on higher plies than given, add to the price given for 4 ply 25 per cent. for each additional ply.

BREWERS' HOSE.

List same as Steam Hose.

Our special brands for Steam and Brewers' Hose are Sphinx, Gulf and Moose.

CORRUGATED TENDER HOSE.

LIST.

		3 Ply.	4 Ply.
1¾ inch, internal diameter	per foot,	$0 70	$0 87
2 " " "	"	80	1 00
2¼ " " "	"	90	1 12
2½ " " "	"	1 00	1 25

AIR-BRAKE AND SIGNAL HOSE.

LIST PRICES.

		3 Ply.	4 Ply.	5 Ply
1 inch	per foot,	$0 67	$0 83	$1 03
1¼ "	"	85	1 04	1 30

CAR-HEATING HOSE.

PRICE LIST.

1 inch, internal diameter, 5 ply	per foot,	$1 03
1¼ " " " 5 "	"	1 30
1½ " " " 5 "	"	1 56

AIR-DRILL HOSE.

	4 PLY. 3 ply inside and 1 ply outside. Per foot.	5 PLY. 4 ply inside and 1 ply outside. Per foot.	6 PLY 5 ply inside and 1 ply outside. Per foot.
¾ inch, diameter	$0 67	$0 84	$1 00
1 " "	83	1 04	1 25
1¼ " "	1 04	1 30	1 56
1½ " "	1 25	1 56	1 88
2 " "	1 66	2 08	2 49
2¼ " "	1 87	2 33	2 80
2½ " "	2 08	2 60	3 12
3 " "			4 20

HOSE COUPLINGS.

Size ..... Inches	½	¾	1	1¼	1½	2	2½	3	3½	4	5
Hose Pipe thread ..... Per dozen	$2.40	2.40	4.40	10.00	14.00	24.00	48.00	75.00	.....	.....	.....
Iron " " ..... "	2.65	2.65	4.65	10.50	15.00	26.00	50.00	76.00	120.00	150.00	250.00

HALF HOSE COUPLINGS.
FEMALE.

Size ..... Inches	½	¾	1	1¼	1½	2	2½	3
Hose Pipe thread ..... Per dozen	$1.80	1.80	3.00	7.20	9.60	16.20	31.80	50.00
Iron " " ..... "	1.80	1.80	3.25	7.80	10.80	17.40	32.80	52.00

STEAM HOSE COUPLINGS.

Size ..... Inches	½	¾	1	1¼	1½	2	2½
Hose Pipe thread ..... Per dozen	$15.00	15.00	18.00	24.00	30.00	42.00	72.00
Iron " " ..... "	15.50	15.50	19.00	25.50	32.00	44.00	75.00

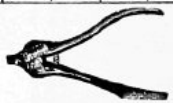
HALF STEAM HOSE COUPLINGS.
FEMALE.

Size ..... Inches	½	¾	1	1¼	1½	2	2½
Hose Pipe thread ..... Per dozen	$10.00	10.00	12.00	16.00	20.00	28.00	48.00
Iron " " ..... "	10.35	10.35	12.75	17.00	21.50	30.00	50.00

HOSE CLAMPS.

Size ..... Inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Price ..... Per dozen	$1.50	1.50	2.00	2.50	3.00	4.00	7.00	10.00	24.00	30.00

CALDWELL PATENT HOSE STRAPS.



Number	2	4	6	8	10	12	14	16	18	20
Size Hose ..... Inches	½	½	¾	¾	1	1	1¼	1¼	1½	1½
Length ..... "	3⅛	3¾	4⅝	4½	5	5⅝	6	6⅜	6¾	7⅜
Price ..... Per dozen	$0.40	.40	.60	.60	.80	.80	1.00	1.00	1.20	1.20

Number	1	2
Size ..... Inches	½ to 1	1¼ to 1½
Price, Fasteners ..... Each	50	.75

HOSE PIPES.

PLAIN.

WITH SCREW TIP.

WITHOUT TIP.

Size Coupling.....Inches	¾	1	1¼	1½	2	2½
Length.....Inches	8	8	12	12	12	15
Price.....Per dozen	87.00	9.00	18.00	22.00	34.00	65.00

WITH SCREW TIP.

Size Coupling...Inches	¾	¾	1	1	1¼	1¼	1¼	1½	1½	1½	2	2	2½
Length.....	8	12	8	12	12	15	20	12	15	20	12	20	15
Price.....Per dozen	$8.00	10.00	10.00	12.00	20.00	24.00	30.00	25.00	30.00	36.00	38.00	50.00	75.00

WITH COCK.

Size—Coupling.....Inches	¾	¾	¾	¾	1	1	1	1¼	1¼
Length.....Inches	6	8	9	12	8	9	12	12	15
Price.....Per dozen	$11.00	13.00	18.00	18.00	15.00	20.00	20.00	40.00	45.00
Size, Coupling.....Inches	1¼	1½	1½	1½	2	2	2½	2½	...
Length..... "	20	12	15	20	12	20	15	24	...
Price.....Per dozen	55.00	55.00	80.00	80.00	80.00	110.00	150.00	200.00	...

UNDERWRITERS' NOZZLES.

For fire department service. 2½ inches internal diameter at the butt, and about 33 inches long, with fittings complete.

With Brass Fittings and Leather Handles, complete.....each, $18.00
With Brass Fittings and Brass Handles, complete..... " 16.50
Without Fittings..... " 8.00

EASILY ADJUSTED. **CRANE HOSE NOZZLE.** FREE FROM LEAKAGE.

Price.....Per dozen, ¾ inch, $10.00 1 inch, $12.00

NOZZLES AND SPRINKLERS.

PET HOSE NOZZLE.

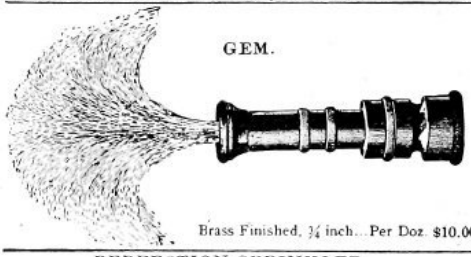
One size only.....¾ inch.
Nickel Plated.....Price, per dozen, $12.00

MAGIC NOZZLES.

Size.....Inches	¾	1
Price per Dozen with Screw Tip.....	$12.00	15.00

If Nickel Plated, 75 cents per dozen net, extra.

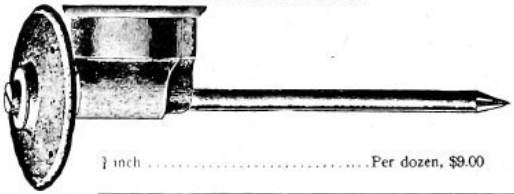
GEM.



FAIRY HOSE NOZZLE.

Brass Finished, ¾ inch...Per Doz. $10.00 Brass Finished, ¾ inch.....Per Dozen, $9.00

PERFECTION SPRINKLER.



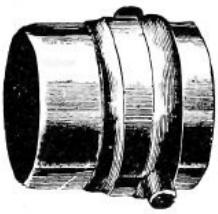
½ inch.....Per dozen, $9.00

BALL NOZZLE SPRINKLER.

BALL NOZZLE SPRINKLER.

	List Price per Dozen.
No. 6-J. Ball Nozzle Lawn Sprinkler with Japanned Stand, Aluminum Elbow and Top.	$18.00
No. 6-B. Ball Nozzle Lawn Sprinkler with Polished Genuine Bronze Stand, Elbow and Top	24.00
No. 6-N. Ball Nozzle Lawn Sprinkler, Stand, Elbow and Top, all Nickel Plated on Bronze Metal	$30 00
No. 6-A. Ball Nozzle Lawn Sprinkler, Stand, Elbow and Top, Antique Copper Finish on Bronze Metal	36 00

EXPANSION RING COUPLINGS.



Sizes, ¾, 1, 1¼, 1½, 2, 2½, 3½ inches.
Prices on application.

DIRECTIONS FOR ORDERING.

In ordering couplings, nozzles, etc., for water hose, observation of the following points will prevent delay and errors in filling orders;

COUPLINGS.

SPECIFY KIND: Shank attached with wire or bands. Expansion ring attached by expanding ring inside of hose.

SPECIFY THREAD: Whether iron pipe or hose thread. If in doubt, send sample of hydrant cap or old coupling.

Hose Reels,

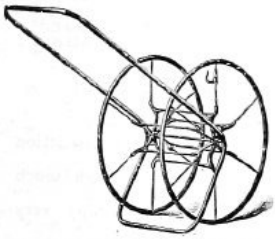
AN all metal reel for a little money. Tubular frame, corrugated iron drum, wire arms, wheels 7 inches in diameter.

The only reel with a corrugated drum. This allows a circulation of air under the hose and prevents mildew. Four of these reels form a natural crate, the drums being "nested" in the frames.

K. C. No. 1

Capacity, 100 feet ¾-inch hose.

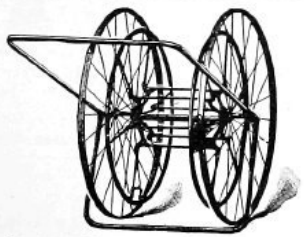
Weight, 12½ pounds. **Price, $2.00**



Tubular All Metal Hose Reel

FRICTIONLESS

Number of Reel	10	20	30
Height of Reel in inches	21	24	29
Weight of Reel in pounds	18	20	30
Capacity of 3-ply ¾-inch Rubber Hose	100 ft.	150 ft.	400 ft.
" " 4-ply 1-inch " "	50 ft.	100 ft.	150 ft.
" " " 1¼-inch " "			100 ft.
" " 1¼-inch Cotton Rubber-lined Hose		100 ft.	200 ft.
" " 1½-inch " " " "		75 ft.	150 ft.
" " 2-inch " " " "			100 ft.
Price	$3.50	$4.00	$6.50



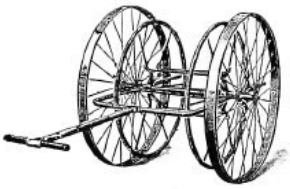
Park Reel

A tubular iron reel and frame mounted on steel wheels.

For parks, lawns, greenhouses, etc.

Number of Reel	21	31
Height of Wheels	28 in.	34 in.
Outside Width over all	26 in.	29 in.
Weight of Reel	40 lb.	50 lb.
Capacity of ¾-inch 3-ply Rubber Hose	200 ft.	500 ft.
" " 1-inch 4-ply " "	100 ft.	200 ft.
" " 1¼-inch " "	75 ft.	150 ft.
" " 1¼-inch Cotton Rubber-lined Hose	150 ft.	300 ft.
" " 1½-inch " " " "	100 ft.	200 ft.
" " 2-inch " " " "	75 ft.	150 ft.
" " 2½-inch " " " "	50 ft.	100 ft.
Price	$7.50	$10.50

Hose Reels.

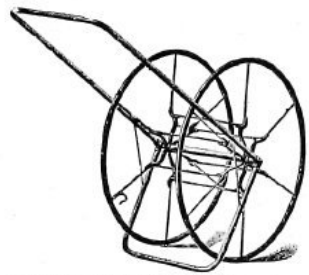


Little Knox Cart

A happy medium. Suitable for a large quantity of small hose or a small quantity of large hose.

Tubular steel reel, frame and tongue Steel wheels with 2-inch tires.

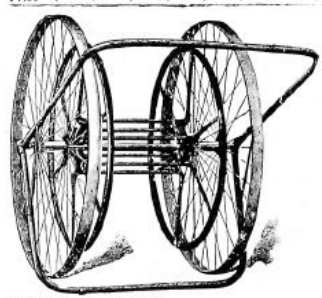
Number of Reel	90	100	110
Height of Wheels in inches	34	36	38
Extreme Outside Width in inches	32	34	36
Weight of Carts Complete, pounds	70	80	100
Capacity of ¾-inch 3-ply Rubber Hose	500 ft.	600 ft.	800 ft.
" " 1-inch 4-ply " "	200 ft.	300 ft.	400 ft.
" " 1¼-inch " "	150 ft.	200 ft.	300 ft.
" " 1½-inch " "	100 ft.	150 ft.	200 ft.
" " 1¼-inch Cotton Rubber-lined Hose	300 ft.	400 ft.	500 ft.
" " 1½-inch " " "	200 ft.	300 ft.	400 ft.
" " 2-inch " " " "	150 ft.	200 ft	300 ft.
" " 2½-inch " " " "	100 ft.	150 ft.	200 ft.
Price	$12.00	$17.00	$25.00



Factory and Mill Reel

THESE Reels are similar in construction to our Garden Reels, though much larger and heavier yet occupy very little space.

Number of Reel	40	50
Height of Reel in inches	85	40
Weight of Reel in pounds	75	100
Capacity of 1-inch 4-ply Rubber Hose	300 ft.	500 ft.
" " 1¼-inch " "	250 ft.	400 ft.
" " 1½-inch " "	200 ft.	300 ft.
" " 2-inch " "	150 ft.	250 ft.
" " 2½-inch " "	100 ft.	200 ft.
" " 1¼-inch Cotton Rubber-lined Hose	500 ft.	800 ft.
" " 1½-inch " " "	400 ft.	600 ft.
" " 2-inch " " "	300 ft.	500 ft.
" " 2½-inch " " "	200 ft.	400 ft.
Price	$25.00	$32.50



Warehouse Reel

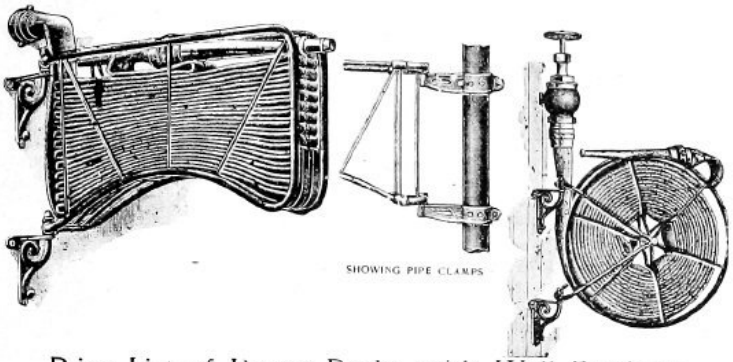
For mills, factories, warehouses and small fire departments.

Tubular reel and frame, steel wheels.

Number of Reel	41	51	61
Height of Wheels in inches	42	48	52
Extreme Width over all	38 in.	40 in.	46 in
Weight of Reel in pounds	150	200	240
Capacity of 1¼-inch 4-ply Rubber Hose	800 ft.	500 ft.	600 ft.
" " 2-inch " " "	200 ft.	400 ft.	500 ft.
" " 2½-inch " " "	150 ft.	300 ft.	400 ft.
" " 1½-inch Cotton Rubber-lined Hose	600 ft.	800 ft.	1000 ft.
" " 2-inch " " " "	400 ft.	650 ft.	850 ft.
" " 2½-inch " " " "	300 ft.	600 ft.	700 ft.
Price	$35.00	$45.00	$55.00

Hump Swinging Hose Rack

Swinging Wall Reel



Price List of Hump Racks with Wall Brackets

We can supply any of the following sizes in gold or aluminum bronze at the same figures, if so desired, or Nos. 4 and smaller will be finished in nickel or copper plate at an additional cost of $3.00 each, net.

Number	Capacity	Size Hose	Description of Hose	Price
A0	50 ft.	1¼-in. or 1½-in.	Unlined Linen	$5.00
A0X	50 ft.	2-in.	" "	5.00
A00	50 ft.	2½-in.	" "	5.00
A1	100 ft.	1¼-in. or 1½-in.	" "	6.00
A1X	100 ft.	2-in.	" "	6.00
A2	100 ft.	2½-in.	" "	6.00
A2	150 ft.	1¼-in. or 1½-in.	" "	7.00
A8X	150 ft.	2-in.	" "	7.00
A4	150 ft.	2½-in.	" "	7.00
A6	200 ft.	1¼-in. or 1½-in.	" "	7.50
A5X	200 ft.	2-in.	" "	7.50
A6	200 ft.	2½-in.	" "	8.00
A8	50 ft.	1¼-in. or 1½-in.	Cotton Rubber-lined Mill	7.00
A8X	50 ft.	2-in.	" " " "	7.00
A4	50 ft.	2½-in.	" " " "	7.00
A5	100 ft.	1¼-in. or 1½-in.	" " " "	7.50
A5X	100 ft.	2-in.	" " " "	7.50
A6	100 ft.	2½-in.	" " " "	8.00

The A0, A0X and A00 will be furnished to hold 75 ft. of hose, adding 50 cents to list price.

NOTICE.—To avoid mistakes and to get the proper rack when you order, give size, kind and length of hose. When you order racks with pipe clamps, be sure you give size of pipe they are to fit. If not standard size pipe, you must give the outside diameter. Pipe clamps cost extra. Always use letter "a" with number of rack.

Price List of Wirt's Swinging Wall Reels with Wall Plates

Number	Capacity	Size Hose	Description of Hose	Price
0	50 ft.	1¼-in. or 1½-in.	Unlined Linen	$ 6.00
00	50 ft.	2-in.	" "	6.00
000	50 ft.	2½-in.	" "	6.00
0½	75 ft.	1¼-in. or 1½-in.	" "	6.00
00½	75 ft.	2-in.	" "	6.00
000½	75 ft.	2½-in.	" "	6.00
1	100 ft.	1¼-in. or 1½-in.	" "	6.00
2½	100 ft.	2-in.	" "	6.00
3½	100 ft.	2½-in.	" "	6.00
2	150 ft.	1¼-in. or 1½-in.	" "	6.00
3	150 ft.	2-in.	" "	6.00
4	150 ft.	2½-in.	" "	6.50
5½	200 ft.	1¼-in. or 1½-in.	" "	7.00
6½	200 ft.	2-in.	" "	7.50
7½	200 ft.	2½-in.	" "	8.00
7	200 ft.	2½-in.	" "	8.50
8	200 ft.	2½-in.	" "	11.50
2	50 ft.	1¼-in. or 1½-in.	Cotton Rubber-lined Mill	6.00
3	50 ft.	2-in.	" " " "	6.00
4	50 ft.	2½-in.	" " " "	6.50
5	100 ft.	1¼-in. or 1½-in.	" " " "	7.50
6	100 ft.	2-in.	" " " "	8.00
7	100 ft.	2½-in.	" " " "	8.50
8	150 ft.	2½-in.	" " " "	11.50

ZELNICKER FIRE PAIL.

This Bucket has been designed to meet the objection that *Fire Pails* can be flattened and used for other purposes. *Zelnicker Fire Pails* can not be flattened, as the *Conical* bottom will withstand any force that does not entirely destroy the bucket. Made extra heavy. Galvanized. Weight per doz., 27 lbs.

Price.....per doz., $8 00

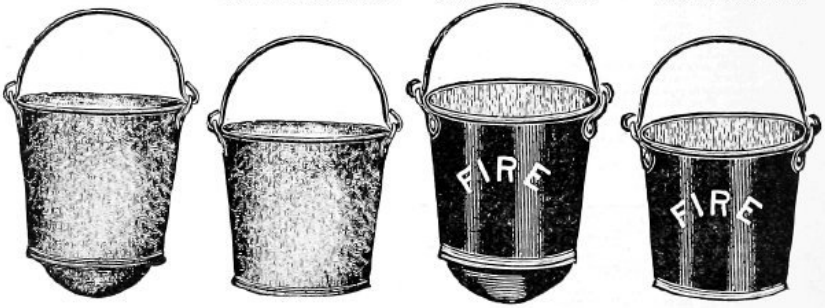
GALVANIZED FIRE PAILS.

ROUND BOTTOMS.
For factories, mills, gin houses, warehouses, steamboats, etc.
Plain.

GALVANIZED PAILS.
With deflected bottom.

ROUND BOTTOMS.
For factories, mills, gin houses, warehouses, steamboats, etc.
Painted red outside.

FLAT BOTTOMS.
Painted red outside.



GALVANIZED FIRE BUCKETS.

Flat Bottom.

10 quart	Per dozen	$4.50
12 "	" "	5.00
14 "	" "	5.50
16 "	" "	7.50

Painted red, $1.00 per dozen net.

Round Bottom

10 quart	Per dozen	$6.75
12 "	" "	7.25
14 "	" "	7.50

Painted red, $1.00 per dozen net.

COVERS FOR GALVANIZED FIRE BUCKETS.

10 quart	Per dozen	$2.00
12 "	" "	2.25
14 "	" "	2.50
16 "	" "	3.00

Painted red, 25c per doz. net extra.

THE CHIEF FIRE EXTINGUISHER.

Is not a liquid, but a dry powder, carefully combined with special apparatus. The powder, thrown into the fire, generates fire-destroying gases which instantly kill the blaze.

It is superior to all other fire extinguishers, as it will extinquish all fires, even such as are caused by gasoline, benzine, paints, oils, grease, spirits, varnishes, gases, or calcic carbide.

It will not explode, corrode, freeze nor weaken.

There are no acids to injure the eyes, burn the flesh or damage fabrics. It is perfectly harmless and can be thrown into the face without hurt.

Price, each.....$3 00

STEMPEL FIRE EXTINGUISHER.

Entirely Automatic.

Can be operated as successfully by a woman, child or man, as when in the hands of a trained fireman, and the Stempel fluid does not injure fabrics. Always ready.

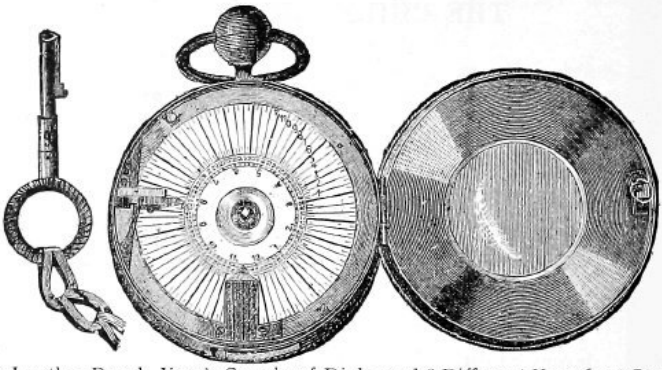
To discharge, turn upside down; ball crushes bottle, instantly generating carbonic acid gas, which is thrown in liquid form a distance of fifty feet.

Every extinguisher is guaranteed to stand double the pressure that it is possible to generate in the machine.

Price, each.....$18 00

Latest Improved Watchman's Time Detector,

With Safety Lock Attachment.



Price, with Leather Pouch, Year's Supply of Dials, and 6 Different Keys for 6 Stations, complete ..... net, $55 00

Price, with Leather Pouch, Year's Supply of Dials, and 8 Different Keys for 8 Stations, complete ..... net, 57 00

Price, with Leather Pouch, Year's Supply of Dials, and 12 Different Keys for 12 Stations, complete ..... net, 60 00

Price, with Leather Pouch, Year's Supply of Dials, and 18 Different Keys for 18 Stations, complete ..... net, 70 00

Price, with Leather Pouch, Year's Supply of Dials, and 24 Different Keys for 24 Stations, complete ..... net, 85 00

The Clock consists of a movement, revolving a Dial, which is supplied with an independent spring so that it cannot be turned back; is divided into hours and minutes, and when operated with the keys, it records the fact upon the Dial, and also the time at which the watchman made his rounds.

ONE OF THE GREAT ADVANTAGES OF THIS CLOCK is, that the registering is done by numbers ranging from 1 to 6, 1 to 12, and 1 to 18, instead of, as in the old style Time Detectors, marking only either by holes or by an impression on the dial, which is the same for all stations.

The movement is separate from the recording mechanism, full jeweled, lever movement, and will run about sixty hours.

The keys should be fastened by staples driven through the link of the safety chain to which they are attached at the different stations the watchman has to visit.

The clock has to be provided daily with a new Dial, on which the date of the night should be written, after which it should be wound up and locked before giving to the watchman.

The Recording is done by inserting the keys into the clock and turning them to the right once, which perforates the Dial with the number of the station

The Case of the Clock is brass heavily nickel plated, also the keys.

On the delivery of the Clock in the morning, it can be seen at once how often, and at what time, the rounds have been made during the night, how long the watchman stayed at the station, and whether all the stations—even the most isolated ones—have been visited on each round; in short, the marked dial tells the exact history of the night's doings

Competitors selling complicated electrical detectors, claim that this watch can be tampered with by making duplicate keys for stations. This can be done by an expert only, and then he must have the watch open to get the key absolutely correct.

To guard against this mode of tampering by experts, we advise the removal of a key, or changing of two keys every once in a while, and you will know for a certainty if you have a dishonest and expert watchman.

A watchman that is expert enough to beat our watch, is much more able to beat an electrical detector—not by one method, but by many.

Further information cheerfully given.

These Detectors are Accepted by the Different Boards of Underwriters of the United States.

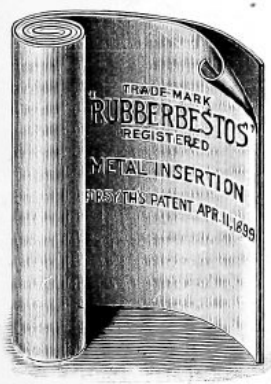
PACKINGS.

Brassbestos Sheet Packing is a combination of gum, brass wire and pure asbestos; the result of years' experience. It will stand any pressure or heat, and will not blow out. It can be used many times and is not affected by oils, acids or gases, and is especially adapted to uneven surfaces. It is the best packing made. Engineers say so; they know.

Brassbestos packing is made as follows:

1/16 thick, weight per yard, 6 lbs.....per lb., $
1/8 " " " " 12 " ..... "

All other packings are very much heavier. Put up in rolls 39 in. wide.



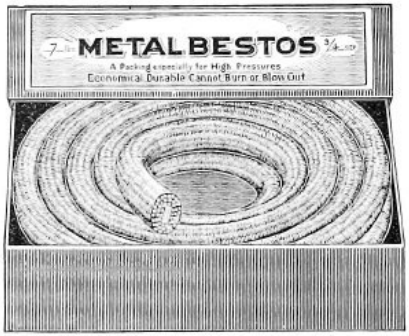
ZELNICKER METAL INSERTION SHEET PACKING.

Composed of the asbestos and rubber compound used in the regular "Rubberbestos" sheet packing, but has insertions of a specially prepared metal.

Particularly adapted for uneven surfaces.

Per lb..... $

"METALBESTOS" HIGH PRESSURE PACKING.

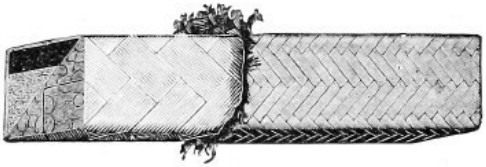


Made with a high grade core, covered with finely spun asbestos twine over which is a covering of soft metallic wire. It cannot burn, char or blow out.

SQUARE FLAX PACKING.

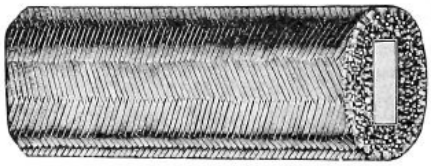
A strictly high-grade article, made of selected long-fibred imported flax, thoroughly lubricated, and great care is taken in its manufacture to make it a first-class packing in every respect.

"COMBINATION" HYDRAULIC AND STEAM PACKING.



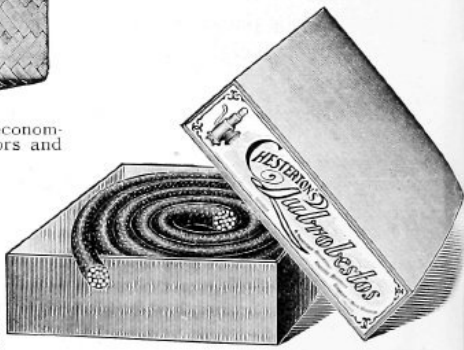
An excellent Steam Packing and is superior and economical for pump, hot and cold water pistons, elevators and plungers.

"METALLO" GUM CORE.



A durable, frictionless Piston Packing. The metallic wire incorporated with the flax strands, holds the packing together and adds greatly to its durability and makes a perfect combination of soft and metallic packing.

LUBROBESTOS PACKING.



Especially adapted for high pressures. Made of selected asbestos lubricated with LUBRINE, a newly discovered lubricant. Asbestos packings made under the ordinary methods soon become hard and cut the rod; this lubricant overcomes the difficulty, prevents scoring and keeps the rod cool. This packing shows surprising lasting qualities. In boxes of about 6 lbs., and 25, 50 and 100 lb. coils.

PACKINGS.

"RUBBERBESTOS" METAL INSERTION TUBULAR GASKETS.

For handhole and manhole plates of boilers. The insertion of flexible metal conforms the Gasket readily to the shape of the plate and helps resist pressure. In following sizes: ¼, ⅜, ½ and ⅝ inch.

SPIRAL AND RING PISTON PACKING.

Spiral.

Elastic Ring.

Sectional Ring.

Spiral Packing, Garlock.....per lb., $1 20
" " " Zelnicker..... " 1 20
Spiral Packing, in boxes, 12 feet, in sizes from ⅛ to 2 inches.
Elastic and Sectional Ring Packing, Garlock.....per lb., $1 20
" " " " " Zelnicker..... " 1 20
Elastic and Sectional Ring Packing, made to order only.

MORRISON SELF-LUBRICATING PACKING.

All sizes, ¼ to 1½ inches, in 5, 10 and 25 lb. reels.....per lb., $0 60

SMOKY CITY PISTON PACKING.

All sizes, ¼ to 1½ inches.....per lb., $0 60

COTTON CANDLE WICKING.

Best quality, in 100 lb. bales, 5 and 10 lb. sacks.....per lb., $0 40

SOAPSTONE PACKING.

All sizes, ¼ to 1 inch, in coils of about 100 lbs.....per lb., $0 15

PLUMBAGO PACKING.

Per lb..... $0 80

MINERAL WOOL.

In bulk, for fireproofing, deadening floors, packing cold storage warehouses, etc.
In bags of 50 lbs. each.....per ton, $25 00

JENKINS PACKING.

Sheet.

Sectional Gasket.

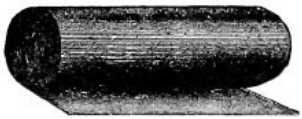
JENKINS SHEET PACKING.

Made $\frac{1}{32}$, $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ Inch Thick, 36 Inches Wide,	Price per Pound,	.80

JENKINS SECTIONAL GASKET PACKING.

Made $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ Inch Diameter. Put up in Boxes.	Price per Pound,	1.00

RED DIAMOND
AND "BLACK ◊" PACKING.



Made $\frac{1}{32}$, $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{3}{16}$, $\frac{1}{4}$ Inch Thick, 36 Inches Wide,	Price per Pound,	.80

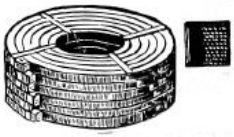
SECTIONAL GASKET PACKING.

Made $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$ Inch Diameter. Put up in Boxes.	Price per Pound,	1.00

PISTON PACKINGS.

Square.

Rubber Back.



Round.

Square, in Coils, $\frac{1}{4}$ to $1\frac{1}{2}$ Inch, 24 feet in a Coil,	Per Pound,	.85
Rubber Back, in Coils, $\frac{1}{4}$ to $1\frac{1}{2}$ Inch, 20 Feet in a Coil,	"	1.00
Round, in Coils, $\frac{1}{4}$ to $1\frac{1}{2}$ Inch, 24 feet in a Coil,	"	.85

HYDRAULIC OR SPECIAL PUMP PACKING.

Square, in Coils, $\frac{1}{4}$ to $1\frac{1}{2}$ Inch, 24 feet in a Coil,	Per Pound,	1.00

DANIELS P.P.P. ROD PACKING

The Best for Steam, Water, Ammonia, Air, Oil, Etc.

TRADE MARK

PAT. AUG. 7. 1894

Sliding Wedges and Oil Cushion, compensating for wear and inequalities of rod and box. The wedges sliding on each other relieve the rod from undue friction or tension; saving many times its price in fuel; lasting many times longer than other packings, thereby saving labor and expense.

Made in all sizes beginning with $\frac{1}{4}$ inch, advancing in size by $\frac{1}{16}$ inch up to 1 inch; and above 1 inch, advancing in size by $\frac{1}{8}$ inch up to 3 inch.

Put up in boxes of from 5 to 10 pounds, according to size.

Regular and Special Grades.

The Regular for Steam Pressures of 100 lbs. and under, Ordinary Water Pressures and Low Ammonia Pressures. **$1.00 per lb.**

Special for Steam Pressures above 100 lbs., High Hydraulics, Hot Water, Etc. **$1.25 per lb.**

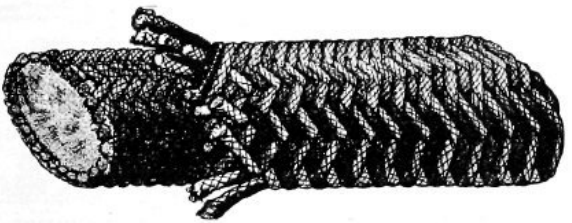
Always say whether you want "Regular" or "Special."

Hemp Packing.

Put up in coils, 10, 25, 50 and 100 pounds.

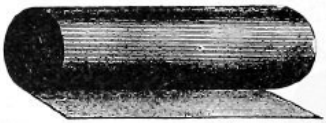
Italian Flax.....per lb
" Hemp, A ..... "
" " B ..... "
American Hemp, A ..... "
" " B ..... "

SEMIBRONZE PACKING



Will not scratch or groove the Piston Rod.
Requires no special care or attention in use.
Is Extra Lubricated.
Is practically frictionless.

STANDARD SHEET PACKING.



PURE SHEET PACKING OR VALVE GUM.

40 inches wide, any thickness. Price. Per lb. $1.40

CLOTH INSERTION OR CLOTH BOTH SIDES.

Made 1/32, 1/16, 3/32, 1/8, 5/16, 1/4 Inch Thick, 36 Inches Wide, Price per Pound, 60

One Ply of Cloth to every 1/16 Inch Thickness.
Each Cloth, whether Insertion or on the Outside, to count as One Ply.

RUBBERBESTOS PACKING.

Sheet.

Will stand more heat, higher pressure, and can be used more times than any other Packing.

Sectional Gasket.

RUBBERBESTOS SHEET PACKING.

Made 1/32, 1/16, 3/32, 1/8, 5/16, 1/4 Inch Thick, 36 inches Wide, Price per Pound, .80

RUBBERBESTOS SECTIONAL GASKET PACKING.

Made 3/8, 1/2, 5/8, 3/4 Inch Diameter. Put up in Boxes of about 5 Pounds each, with Tape and Metal Tubes, Price per Pound, 1.00

Sheet.

RAINBOW PACKING.

Eclipse Gasket.

RAINBOW SHEET PACKING.

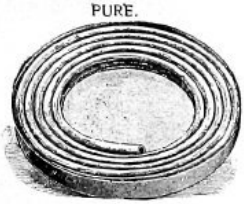
Made 1/32, 1/16, 3/32, 1/8, 5/16, 1/4 Inch Thick, 36 Inches Wide, Price per Pound, .80

ECLIPSE SECTIONAL GASKET PACKING.

Made 3/8, 1/2, 5/8, 3/4, 7/8, 1 Inch Diameter. Put up in Boxes. Price per Pound, 1.00

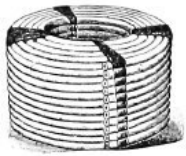
RUBBER TUBING.

PURE.



Made with walls ⅛, 3-32, 1-16 inch thick, with smooth or corrugated surface, and put up in boxes of convenient size, containing 50 to 100 feet each.

CLOTH INSERTION



Made Seamless in 50-foot lengths.

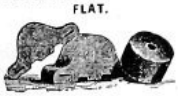
Int. Diam.	Per Ft.	Int. Diam.	Per Ft.	Int. Diam.	Per Ft.	Int. Diam.	Per Ft.
⅛ inch	$0.08	½ inch	$0.25	⅛ inch	$0.10	½ inch	$0.28
1/16 "	.12	⅝ "	.30	1/16 "	.14	⅝ "	.33
¼ "	.16	¾ "	.35	¼ "	.18	¾ "	.38
5/16 "	.18	1 "	.45	5/16 "	.20	1 "	.50
⅜ "	.20			⅜ "	.23		

SOLID VALVE BALLS.

	Per Doz.		Per Doz.
1 inch or less	$1.00	2½ inch	$10.50
1⅛ " "	1.40	2¾ "	13.00
1¼ " "	1.90	3 "	15.50
1⅜ " "	2.50	3¼ "	19.50
1½ " "	3.25	3½ "	23.50
1⅝ " "	4.00	3¾ "	29.25
1¾ " "	4.75	4 "	35.00
1⅞ " "	5.50	4½ "	54.50
2 " "	6.50	5 "	70.00
2¼ " "	8.00	6 "	115.00

WAGON SPRINGS.

FLAT.



No. 1.	2½	inch high,	1¼	inch thick.	...Per pound,	$0.35
" 2.	3½	" "	1½	" "	..... " "	.35
" 3.	3¾	" "	1¾	" "	..... " "	.35
" 4	4	" "	2	" "	..... " "	.35

ROUND.

Diam., 2 in. to 6 in.; thickness, 1 in. to 3 in. . Per lb., $0.50

CAR SPRINGS.

Per pound $1.50

PURE GUM VALVES.

For Steamers, Pumps and Engines.

Price, per pound $1.50

SOFT VALVES.

For use in cold water or water below the boiling point, also for use in Air Pumps.

MEDIUM HARD VALVES.

For cold or moderately hot water; are very durable and will stand heavy pressure.

HARD VALVES.

Are made for hot water of very high temperature, and will stand oily water. Will give long service at great pressure.

PURE CORD.

1/16 in., per lb.	$1.90	5/16 in., per lb.	$1.65
¼ " "	1.80	¾ " "	1.60
⅜ " "	1.75	⅞ " "	1.55
½ " "	1.70	1 " and larger	1.50

PURE RUBBER CEMENT.

We carry in stock only the very best Pure Rubber Cement, and can make it to order at short notice of any quality or consistency.

No. 3 (half pints)	Per dozen,	$ 3.60
No. 2 (pints)	" "	7.20
No. 1 (quarts)	" "	14.40
No. 0 (1 gallon)	each,	4.00
No. 00 (5 gallons)	"	20.00

ASBESTOS SHEET MILL-BOARD.

In sheets 40x40 inches, from 1/32 to 1/2 inch thick.

Case lots.....per lb., $0 07
Broken cases..... " 10
Cases weigh about 250 lbs.

ASBESTOS WICK PACKING.

In 1/4, 1/2 and 1 lb. balls and on 5 and 10 lb. spools, as follows:

Standard Asbestos Wick Packing, per lb.....$0 50
Standard Asbestos Rope Packing, per lb..... 50

FRICTION PAPER OR BOARD.

Used for making Paper Friction Pulleys.

Sheets are 46x35 inches, 4 or 5 sheets to a bundle. Weight of each bundle is 50 lbs.

Genuine Davy Board.....per bundle, $
" " " ..... " sheet,

Standard Board.....per bundle, $
" " ..... " sheet,

GAUGE GLASS WASHERS.

Round.

Half Round.

Square.

	Square.	Round.	Per doz.
1/2 inch	14 oz.	10 1/2 oz.	$1 50
5/8 "	16 "	11 "	1 75
3/4 "	18 1/2 "	13 "	2 00

DIAPHRAGMS.

High. Low.

High Pressure.

LIST.

No. 1. 6 3/4 inches diameter.....each, $0 50
No. 2. 9 " " ..... " 80
No. 3. 11 1/2 " " ..... " 1 50

Low Pressure.

LIST.

No. 4. 9 inches diameter.....each, $0 80
No. 7. 9 1/2 " " ..... " 1 00

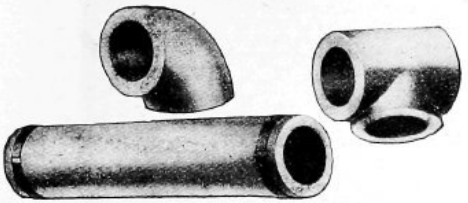
SHEAVE FILLING.

Furnished in 25 different sizes and shapes. New moulds made promptly if desired.

They are made of tough rubber, specially designed to withstand the wear of wire rope.

85% MAGNESIA SECTIONAL PIPE COVERING.

For High Pressure Steam.



This covering is composed of 85 per cent. pure carbonate of magnesium, combined with asbestos fibre, formed into various shapes under hydraulic pressure, producing a most efficient and durable insulating material.

It is furnished in sections 3 feet long with canvas jacket and bands to fit all sizes of wrought iron pipe from ½ inch to 10 inches, inclusive.

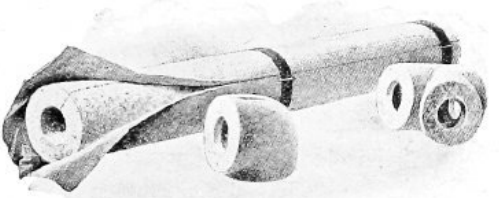
ASBESTOS MOULDED SECTIONAL PIPE COVERING.

This is a moulded covering, absolutely fire-proof, durable and tough; is equal, if not superior, to any moulded covering of similar construction.

It is made in sections 3 feet long to fit any size pipe from ½ to 16 inches, inclusive.

This covering is finished with a canvas jacket with lap to be pasted over ends, and metal bands.

Ells, Tees, etc., to match.



ASBESTOS CEMENT.

This is composed of asbestos fibre, infusorial earth, and a cementing compound. It is applied with a trowel to steam pipes, boilers, etc., while heated. It is recommended for all steam heated surfaces; furnished in bags dry. One bag contains sufficient material for covering about 30 square feet 1 inch thick.

Per bag.....$2 50

Weight, 130 lbs.

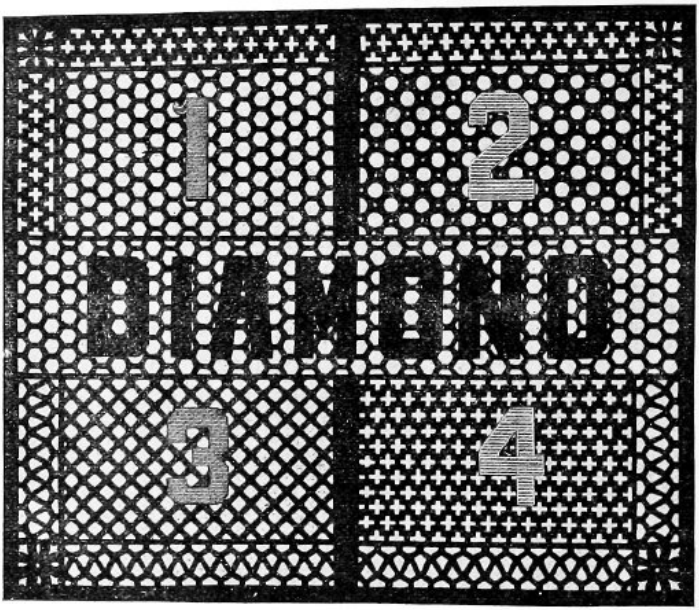
Inside Diameter of Pipe.	Covering, per foot.	Elbows, each.	Tees, each.	Valves, each.
½ inch	$0 20	$0 25	$0 33	$0 33
¾ "	22	25	33	33
1 "	23	25	33	33
1¼ "	24	25	33	33
1½ "	25	25	33	33
2 "	27	27	36	36
2½ "	31	31	41	41
3 "	36	36	48	48
3½ "	40	40	53	53
4 "	44	44	59	59
4½ "	47	47	63	63
5 "	50	50	67	67
6 "	58	58	77	77
7 "	67	70	90	90
8 "	74	77	1 00	1 00
9 "	83	84	1 15	
10 "	95	1 00	1 30	
12 "	1 10			
13 "	1 20			

Outside Diameter of Pipe.	Covering, per foot.
14 inch	$1 30
15 "	1 45
16 "	1 55

Use Asbestos Cement Felting for fittings larger than 10 inches and for irregular fittings.

Larger sizes of Sectional Coverings made to order.

PERFORATED MATS.



PRICE LIST OF PERFORATED MATS.

¼ inch thick	per square foot,	$0 75
⅜ " "	" "	1 00
½ " "	" "	1 25
⅝ " "	" "	1 50
¾ " "	" "	1 75
1 " "	" "	2 00

SOLID BACK PERFORATED MATS.

Adapted for use in front of soda fountains and under umbrella stands, where it is desirable to have a mat that will hold water.

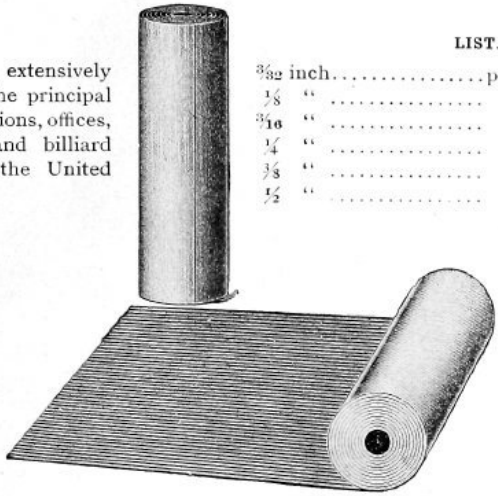
PRICE LIST.

¼ inch	per square foot,	$1 00
⅜ "	" "	1 25
½ "	" "	1 50

Lettering 25 cents per letter extra. Red or white letters 50 cents per letter extra.

MATTING—CORRUGATED.

This Matting is extensively used in many of the principal hotels, railroad stations, offices, public buildings and billiard halls throughout the United States.



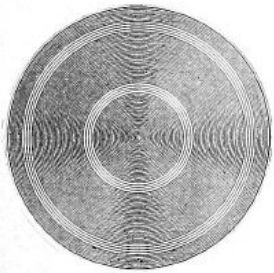
LIST.

3/32 inch	per square foot,		$0 33
1/8 "	"	"	40
3/16 "	"	"	56
1/4 "	"	"	73
3/8 "	"	"	1 03
1/2 "	"	"	1 30

MOULDED DOOR MATS.

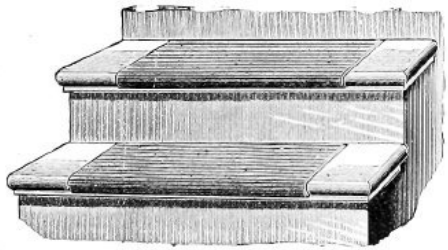
17x31 inches	per doz.,	$30 00
18x36 "	"	36 00
30x40 "	"	48 00

MOULDED CUSPIDOR OR PITCHER MATS.



8 inches diameter	per doz.,		$ 5 00
12 "	"	"	7 00
15 "	"	"	9 00
18 "	"	"	11 00

CORRUGATED STAIR TREADS.



These treads are cut to order in any desired size or shape.

Net prices per lb. on application.

COTTON WASTE.

Zelnicker, white, in 100 and 500 lb. bales.....per lb., $
W. A. Z., " " 100 " 500 " " ..... "
Zelnicker, colored, in 100 and 500 lb. bales..... "
W. A. Z., " " 100 " 500 " " ..... "
Dynamo, white, in 100 and 500 lb. bales..... "
Furniture Rubbing, blue white, in 100 and 500 lb. bales..... "
" " cream, " 100 " 500 " " ..... "

WOOL WASTE.

Zelnicker, in 100 and 500 lb. bales.....per lb., $
W. A. Z., " 100 " 500 " " ..... "

RAGS OR WIPERS.

White, washed, in 100 and 500 lb. bales.....per lb., $
Colored, " " 100 " 500 " " ..... "
Ravelings, " 100 " 500 " " ..... "
Clippings, " 100 " 500 " " ..... "

OAKUM.

Oakum, Best.....per bale, $
" U. S..... "
" Navy..... "

50 lbs. in a bale.

SISAL LATH YARN.

The Plymouth Lath Yarns are the strongest, most evenly spun, and the most economical Lath Yarns made. These Yarns for years past have been and are to-day unequaled by any other make. Each coil of the genuine is stenciled with the above trade-mark, as shown in the illustration. They are lightly tarred, and weigh considerably less to a given length than any other make in the market. They are not filled or loaded with tar, as is the case with many other makes, enough only being used to preserve the fibre from the weather and prevent decay. Coils weigh about 100 lbs. each.

Plymouth Ship Brand, tarred,	130 strands	per lb.,	$
" " " "	200 "	"	
" " " untarred,	130 "	"	
" " " "	200 "	"	
"W. A. Z." Brand, tarred,	130 "	"	
" " "	200 "	"	
" " untarred,	130 "	"	
" " "	200 "	"	

FLAX TWINE.

No. 9 B. C. Flax Twine		per lb.,	$
No. 12 " " "		"	
No. 18 " " "		"	
No. 24 " " "		"	
No. 36 " " "		"	
No. 12 Cable Laid Flax Twine		"	
No. 18 " " " "		"	
No. 24 " " " "		"	
No. 36 " " " "		"	

JUTE TWINE.

Jute Twine, 2, 3, 4, 5 and 6 ply in ½ lb. balls		per lb.,	$

Cut of Imperial

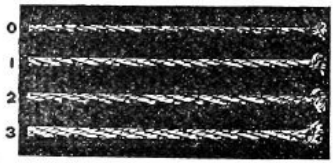
Weights and Sizes.

Size No. 6.	Diameter $\frac{7}{32}$	inch, about	18 lbs.	to dozen,	66	feet to	lb.,	for weights	less than 10 lbs.	Per lb., $....
" No. 7.	" $\frac{1}{4}$	"	23 lbs.	"	52	"	lb.,	" "	10 to 15 lbs.	" ....
" No. 8.	" $\frac{9}{32}$	"	27 lbs.	"	44	"	lb.,	" "	15 to 25 lbs.	" ....
" No. 9.	" $\frac{5}{16}$	"	33 lbs.	"	36	"	lb.,	" "	25 to 35 lbs.	" ....
" No. 10.	" $\frac{3}{8}$	"	44 lbs.	"	27	"	lb.,	" "	35 to 45 lbs.	" ....
" No. 12.	" $\frac{7}{16}$	"	60 lbs.	"	20	"	lb.,	" "	heavier than 45 lbs.	" ....

Put up in hanks of 100 feet each (two connected), one dozen hanks (1,200 feet) in a package, or in coils of 1,200 feet or longer.

H. C. Co. Imperial, A grade, white cotton	net, per lb.,	.....
" " A " drab "	" "	.....
" " A " mahogany cotton	" "	.....
Silver Lake, A grade, white cotton	list, "	$0.35
" " A " drab "	" "	.40
" " Italian hemp	" "	.40
" " Linen	" "	.57½
" " B grade, cotton, white	" "	.30
" " Cotton, drab	" "	.35
Samson, white cotton	" "	.50
" " " "Spot"	" "	.50
" Drab "	" "	.55
" Italian hemp	" "	.50
" Linen	" "	.70
Massachusetts, white cotton	" "	.30
" Drab "	" "	.35
India Hemp Sash Cord Put up in 60 feet hanks, 1 gross in a bale.	" "	.....
Italian " " "	" "	.....

SOLID BRAIDED CHALK LINES.



Bleached cotton, put up in hanks of 20 feet each, 1 dozen in a bunch, packed in gross and ½ gross boxes.

Nos.	0	1	2	3
Per gross	$6.00	$6.50	$7.00	$7.50

ITALIAN HEMP GARDEN LINES.

Solid braided, in hanks of 100 feet each (two lines connected), 1 dozen in a package.
Italian hemp, size of No. 4½ ..... per doz., $5.00

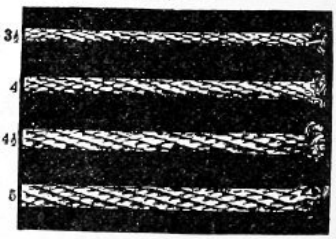
SOLID BRAIDED CURTAIN CORD.

Made in variety of colors. In pieces of 50 yards each, 1 dozen in a box.

Cotton, white or colored ..... per doz., $4.00
Linen, " ..... " 6.00

BRAIDED COTTON MASONS' LINES.

VENTILATOR CORD, AWNING LINES, HEAVY SHADE CORD, ETC.



Put up in hanks of 48 feet each, several connected, 1 dozen (192 yards) in a box, except No. 5, which is put up in 100 foot hanks.

	Price per Dozen.			100 feet Hanks.
Nos.	3½	4	4½	5
White or drab	$1.50	$2.00	$2.50	$ 7.50
Other colors	2.00	2.50	3.00	.....
Linen	2.50	3.50	4.50	12.00

Double T Branch.

Running Trap without Hand Hole.

Breeches.

Vent Trap.

Regulation Curve.

Decreaser.

Increaser.

T Branch.

Slant.

Y Branch.

Superior Salt-Glazed

Standard

VITRIFIED PIPE.

Inside Diameter, inches.	Straight Pipe per foot.	Curves and Elbows, each	T & Y Branches, Two feet long, each	Traps, each.	Double Branches and Breeches, each.	Increasers, Decreasers and Slants, each.	Weight per foot, pounds.	Carloads, 14 tons, feet.
3	$ 15	$ 50	$ 60	$1 70	$ 90	$ 45	7	4000
4	20	60	80	2 10	1 20	60	9	3000
5	25	75	1 00	2 50	1 50	75	11	2500
6	30	1 00	1 20	2 90	1 80	90	16	1750
7	35	1 25	1 40	3 50	2 10	1 05	18	1550
8	40	1 50	1 60	4 00	2 40	1 20	23	1200
9	50	1 75	2 00	5 00	3 00	1 50	25	1000
10	60	2 10	2 40	6 00	3 60	1 80	28	800
12	75	2 75	3 00	8 50	4 50	2 25	38	620
14	90	3 25	3 60			2 70	56	500
15	1 00	3 75	4 00			3 00	60	470
16	1 20	4 25	4 80			3 60	65	430
18	1 50	4 75	6 00			4 50	85	330
20	1 75	5 75	7 00			5 25	105	270
21	1 90	6 25	7 60			5 70	110	260
22	2 10	7 00	8 40			6 30	115	245
24	2 50	8 00	10 00			7 50	135	210
27								
28								
30								
33								
36								

Traps are made either with or without hand holes.

Double Branches above 12 in. made only to order.

special price list of large sizes.

Above Price List is subject to large discounts.

For Carloads we make prices delivered at destination, we assuming all risks in transit.

For less than Carloads we make prices f. o. b. St. Louis only.

For illustration of Standard Fittings, see next page.

Superior Salt-Glazed

DOUBLE STRENGTH

VITRIFIED PIPE.

WITH CORRUGATED DEEP SOCKETS.

12 to 24-inch, 2½-foot lengths.
27 to 36-inch, 3-foot lengths.

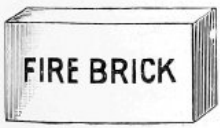
Inside Diameter	Price per Foot.	Thickness Shell.	Weight Per Foot.	Capacity.	Car Load. 15 Tons.
12 in	$0 30	1 in	50 lbs.	133 sq. in.	600 ft.
14 "	36	1 1-6 "	60 "	154 "	500 "
15 "	42	1 1-4 "	70 "	177 "	430 "
16 "	50	1 1-3 "	80 "	201 "	375 "
18 "	68	1 1-2 "	100 "	254 "	300 "
20 "	88	1 2-3 "	125 "	314 "	240 "
21 "	1 05	1 3-4 "	135 "	345 "	220 "
22 "	1 25	1 5-6 "	148 "	380 "	200 "
24 "	1 50	2 "	180 "	452 "	170 "
27 "	2 00	2 1-4 "	230 "	572 "	132 "
28 "	2 20	2 1-3 "	245 "	616 "	125 "
30 "	2 50	2 1-2 "	290 "	706 "	102 "
33 "	3 20	2 5-8 "	340 "	855 "	90 "
36 "	4 00	2 3-4 "	386 "	1018 "	81 "

Subject to discount.

For carloads we make prices for delivery at destination, we assuming all risks in transit.

For less than carloads we quote f. o. b. St. Louis only.

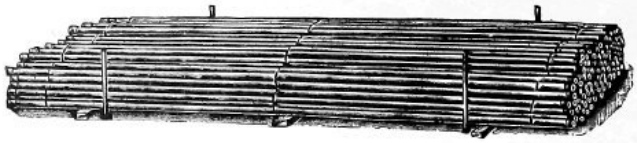
Send for pamphlet, "Vitrified Pipe Culvert Construction."



FIRE BRICK.

This brick is manufactured from the famous Cheltenham Clay, which has the reputation of being one of the best fire clays in the world. It is very uniform in size and perfect in shape. We recommend this brick for Coal Gas Furnaces, Annealing Ovens, Boiler Settings, Bake Ovens, Brick and Tile Kilns, lining Smoke Stacks, Coke Ovens, Garbage Crematories, Refuse Burners for Saw Mills, etc., etc.

STANDARD STEAM. GAS AND WATER PIPE.



Black and Galvanized.

Manufacturers' List, Adopted February 15, 1900.

Nominal Inside Diameter. Inches.	Price per foot.	Each Cut or Thread.	Nominal Weight per foot. Pounds.	Actual Outside Diameter. Inches.	Thickness. Inches.	No. of Threads per inch of Screw.
⅛	.05½	.05	.24	.40	.068	27
¼	.05½	.05	.42	.54	.088	18
⅜	.05½	.05	.56	.67	.091	18
½	.08½	.05	.84	.84	.109	14
¾	.11½	.05	1.12	1.05	.113	14
1	.16½	.06	1.67	1.31	.134	11½
1¼	.22½	.07	2.24	1.66	.140	11½
1½	.27	.08	2.68	1.9	.145	11½
2	.36	.10	3.61	2.37	.154	11½
2½	.57½	.15	5.74	2.87	.204	8
3	.75½	.20	7.54	3.5	.217	8
3½	.95	.25	9.	4.	.226	8
4	1.08	.35	10.66	4.5	.237	8
4½	1.30	.45	12.49	5.	.246	8
5	1.45	.55	14.50	5.56	.259	8
6	1.88	.70	18.76	6.62	.280	8
7	2.35	.85	23.27	7.62	.301	8
8	2.82	1.00	28.18	8.62	.322	8
9	3.40	1.25	33.70	9.62	.344	8
10	4.25	1.50	40.06	10.75	.366	8
11	4.75	2.00	45.02	11.75	.375	8
12	5.20	2.50	49.	12.75	.375	8

Unless otherwise ordered, black pipe, random lengths, with threads and couplings will be shipped.

For cut lengths an extra charge will be made above random lengths.

For pipe smoothed on the inside, known as plugged and reamed, an extra charge will be made above regular pipe.

For galvanized pipe an extra charge will be made above black.

For asphalted pipe an extra charge will be made above black.

MANUFACTURERS' PRICE LIST WROUGHT IRON WELDED GAS PIPE.

Adopted March 1, 1900.

Standard Weight Lap Welded Wrought Iron Pipe.

Plain and Galvanized, for Gas, Steam or Water.

1¼ inch and below, butt welded; proved to 300 pounds per square inch, hydraulic pressure.

1½ inch and above, lap welded; proved to 300 pounds per square inch, hydraulic pressure.

STANDARD STEAM, GAS AND WATER PIPE.

BLACK AND GALVANIZED.

Nominal Inside Diameter.	Price, per Foot.	Thickness.	Nominal Weight, per Foot.	No. of Threads per Inch of Screw.	Price for Extra Cuts or Threads.	Nominal Inside Diameter.	Price, per Foot.	Thickness.	Nominal Weight, per Foot.	No. of Threads per Inch of Screw.	Price for Extra Cuts or Threads.
⅛	$0.05½	.068	0.24	27	$0.06	3½	$0.95	.226	9.00	8	$0.35
¼	.05½	.088	0.42	18	.06	4	1.08	.237	10.66	8	.45
⅜	.05½	.091	0.56	18	.06	4½	1.30	.246	12.49	8	.55
½	.08½	.109	0.84	14	.06	5	1.45	.259	14.50	8	.60
¾	.11½	.113	1.12	14	.06	6	1.88	.280	18.76	8	.80
1	.16½	.134	1.67	11½	.08	7	2.35	.301	23.27	8	1.25
1¼	.22½	.140	2.24	11½	.09	8	2.82	.322	28.18	8	1.60
1½	.27	.145	2.68	11½	.10	9	3.40	.344	33.70	8	2.50
2	.36	.154	3.61	11½	.15	10	4.25	.366	40.00	8	3.00
2½	.57½	.204	5.74	8	.25	11	4.75	.375	45.00	8	3.50
3	.75½	.217	7.51	8	.30	12	5.20	.375	49.00	8	4.00

Unless otherwise ordered, black pipe, random lengths, with threads and couplings, will be shipped.

For cut lengths an extra charge will be made above random lengths.

For pipe, smoothed on the inside, known as plugged and reamed, an extra charge will be made above regular pipe.

For galvanized pipe an extra charge will be made above black.

For asphalted pipe an extra charge will be made above black.

EXTRA STRONG STEAM, GAS AND WATER PIPE.

Manufacturers' List, Adopted February 15, 1900.

Size. Inches.	Price per Foot.	Actual Outside Diameter.	Nominal Inside Diameter.	Thickness. Inches.	Nominal Weight per Foot. Pounds.
⅛	.11	.405	.205	.100	.29
¼	.11	.540	.294	.123	.54
⅜	.11	.675	.421	.127	.74
½	.12	.840	.542	.149	1.09
¾	.15	1.05	.736	.157	1.39
1	.22	1.315	.951	.182	2.17
1¼	.30	1.66	1.272	.194	3.00
1½	.36	1.90	1.494	.203	3.63
2	.50	2.375	1.933	.221	5.02
2½	.81	2.875	2.315	.280	7.67
3	1.05	3.500	2.892	.304	10.25
3½	1.33	4.000	3.358	.321	12.47
4	1.50	4.500	3.818	.341	14.97
4½	1.95	5.000	4.280	.360	18.22
5	2.16	5.563	4.813	.375	20.54
6	2.90	6.625	5.750	.437	28.58
7	3.80	7.625	6.625	.500	37.67
8	4.30	8.625	7.625	.500	43.00

DOUBLE EXTRA STRONG STEAM AND WATER PIPE.

Size. Inches.	Price per Foot.	Actual Outside Diameter.	Nominal Inside Diameter	Thickness. Inches.	Nominal Weight per Foot. Pounds.
½	.25	.84	.244	.298	1.70
¾	.30	1.05	.422	.314	2.44
1	.37	1.315	.587	.364	3.65
1¼	.52	1.66	.885	.388	5.20
1½	.65	1.90	1.088	.406	6.40
2	.95	2.375	1.491	.442	9.02
2½	1.37	2.875	1.755	.560	13.68
3	1.92	3.50	2.284	.608	18.56
3½	2.45	4.00	2.716	.642	22.75
4	2.85	4.50	3.136	.682	27.48
4½	3.30	5.00	3.564	.718	32.53
5	3.80	5.563	4.063	.75	38.12
6	5.30	6.625	4.875	.875	53.11
7	6.25	7.625	5.875	.875	62.38
8	7.20	8.625	6.875	.875	71.62

Extra Strong and Double Extra Strong will be shipped in random lengths and plain ends unless otherwise ordered.

For pipe fitted with threads and couplings an extra charge will be made above regular.

For cut lengths an extra charge will be made above random.

For galvanized or asphalted an extra charge will be made above black.

Extra Heavy or Hydraulic Tubes, away from Standard, special prices given on application

STANDARD LAP-WELDED BOILER TUBES.

Manufacturers' List, Adopted February 15, 1900.

Outside Diameter. Inches.	Price per Foot.	Thickness. Inches.	Thickness Nearest B. W. G.	Nominal Weight per Foot. Pounds.
1	.30	.095	13	.90
1¼	.28	.095	13	1.15
1½	.27	.095	13	1.40
1¾	.22	.095	13	1.66
2	.20	.095	13	1.91
2¼	.24	.095	13	2.16
2½	.28	.109	12	2.75
2¾	.34	.109	12	3.04
3	.35	.109	12	3.33
3¼	.40	.120	11	3.96
3½	.44	.120	11	4.28
3¾	.50	.120	11	4.60
4	.55	.134	10	5.47
4½	.62	.134	10	6.17
5	.75	.148	9	7.58
6	1.00	.165	8	10.16
7	1.20	.165	8	11.90
8	1.50	.165	8	13.65
9	1.70	.180	7	16.76
10	2.10	.203	6	21.00
11	2.50	.220	5	25.00
12	2.90	.229	4½	28.50
13	3.20	.238	4	32.06
14	3.65	.248	3½	36.00
15	4.10	.259	3	40.60
16	4.60	.270	2½	45.20

Extra Wire Gauge Boiler Tubes.

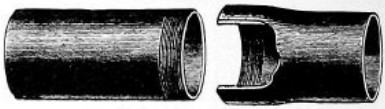
For extra wire gauge boiler tubes, away from Standard, not exceeding four wire gauges, one cent for each inch in diameter of tube for each additional gauge will be charged and added to net of invoice.

Tubes more than four wire gauges heavier than Standard will be charged by the pound the same as plain end stay tubes, arch pipes, dry pipes and water grates.

SCREW AND SOCKET AND INSERTED JOINT LAP-WELDED CASING.

Screw and Socket.

Inserted Joint.



Manufacturers' List, Adopted February 15, 1900.

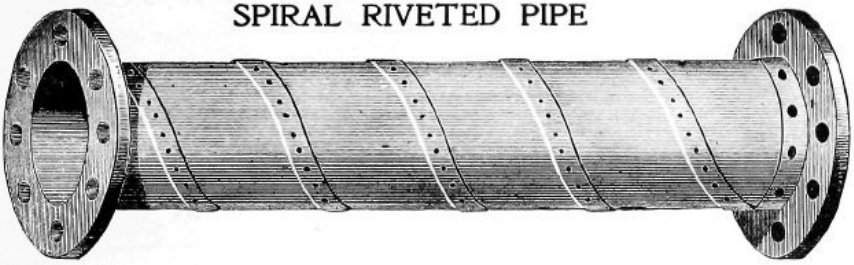
Nominal Inside Diameter Inches.	Actual Outside Diameter. Inches.	Price, per Foot.	Nominal Weight, per Foot. Lbs.	No. Threads per Inch of Screw.
2	2 1/4	.23	2.22	14
2 1/4	2 1/2	.29	2.82	14
2 1/2	2 3/4	.32	3.13	14
2 3/4	3	.35	3.45	14
3	3 1/4	.41	4.10	14
3 1/4	3 1/2	.45	4.45	14
3 1/2	3 3/4	.48	4.78	14
3 3/4	4	.56	5.56	14
4	4 1/4	.60	6.00	14
4 1/4	4 1/2	.64	6.36	14
4 1/2	4 3/4	.68	6.78	14
4 3/4	5	.78	7.80	14
5	5 1/4	.82	8.20	14
5 1/8	5 1/2	.87	8.62	14
5 5/8	6	1.05	0.46	14
6 1/4	6 5/8	1.16	11.58	14
6 5/8	7	1.24	12.34	14
7 1/4	7 5/8	1.36	13.55	14
7 5/8	8	1.55	15.41	11 1/2
8 1/4	8 5/8	1.61	16.07	11 1/2
8 5/8	9	1.76	17.60	11 1/2
9 5/8	10	2.20	21.90	11 1/2
10 5/8	11	2.68	26.72	11 1/2
11 5/8	12	3.05	30.35	11 1/2
12 1/2	13	3.38	33.78	11 1/2

Random lengths with threads and couplings will be shipped unless otherwise ordered.

For cut lengths an extra charge will be made above random.

For galvanized or asphalted an extra charge will be made above black.

SPIRAL RIVETED PIPE



IMPORTANT NOTICE

It is important that the correct pipe be used in the proper places. For pump suction, exhaust steam, etc., use double galvanized pipe

It is also important that pipe of correct guage be used for the duty required of it.

No. 24 GUAGE SPIRAL RIVETED PIPE

No. 24 BIRMINGHAM WIRE GUAGE. THICKNESS .022 INCH

DIAMETER IN INCHES	BLACK	ASPHALTED	GALVANIZED	APPROXIMATE WEIGHT PER 100 FEET
3	$ .20	$ .23	$ .30	100 lbs.
4	.25	.29	.38	130 "
5	.30	.35	.45	160 "
6	.33	.39	.50	185 "

No. 22 GUAGE SPIRAL RIVETED PIPE

No. 22 BIRMINGHAM WIRE GUAGE. THICKNESS .028 INCH.

DIAMETER IN INCHES	BLACK	ASPHALTED	GALVANIZED	APPROXIMATE WEIGHT PER 100 FEET
3	$ .24	$ .27	$ .32	130 lbs.
4	.30	.34	.43	160 "
5	.37	.42	.53	200 "
6	.40	.46	.60	230 "
7	.45	.52	.65	260 "
8	.53	.61	.75	300 "
9	.60	.69	.90	340 "
10	.65	.75	1.00	380 "

Approximate weights are for black pipe only.

GALVANIZED CAST AND WROUGHT IRON FITTINGS.
FOR FLANGED RIVETED PIPE.

CAST IRON FLANGED ELBOW.

CAST IRON FLANGED TEE.

CAST IRON FLANGED CROSS.

Inside Diameter.	Elbows.	Tees.	Crosses.	Reducers.	Flanges.	Disks or Blind Flanges.	Bolts and Nuts.	Composition Gaskets.
3 inch	$1.60	$2.75	$4.15	$	$0.39	$0.45	$0.04	10.09
4 "	2.10	3.25	5.30	* 3.00	.52	.65	04	.10
5 "	2.85	4.40	6.70	* 3.50	.65	.78	04	.12
6 "	4.10	5.70	8.00	* 4.75	.78	1.17	04½	.16
7 "	5.10	7.30	11.00	* 5.50	1.04	1.56	04½	.18
8 "	6.70	9.80	14.25	* 6.50	1.17	1.82	04½	.23
9 "	9.00	13.80	18.80	* 8.00	1.56	2.34	04½	.31
10 "	10.00	17.60	24.50	*10.25	1.82	2.47	04½	.40
11 "	*13.00	*20.00	*26.50	*12.00	1.95	3.25	04½	.45
12 "	15.80	22.50	30.00	*13.00	2.08	3.90	04½	.50
13 "	19.15	*25.00	*33.50	*14.60	2.34	4.55	04½	.56
14 "	22.30	30.50	38.00	*16.50	2.60	5.46	.05	.63
15 "	26.00	*37.00	*45.00	*18.40	3.12	5.98	05	.75
16 "	30.00	44.00	53.00	*21.30	4.42	6.76	05	.90
18 "	*34.00	*50.00	*59.00	*26.00	5.07	9.10	05	1.08
20 "	*38.50	*56.00	*67.00	*29.40	5.59	11.70	05	1.25
22 "	*42.00	*60.00	*77.00	*33.00	9.10	14.30	05½	1.75
24 "	*45.00	*70.00	*87.00	*37.00	9.75	16.90	05½	2.00

BLACK CAST AND WROUGHT IRON FITTINGS.
FOR FLANGED RIVETED PIPE.

Inside Diameter.	Elbows.	Tees.	Crosses.	Reducers.	Flanges.	Disks or Blind Flanges.	Bolts and Nuts.	Composition Gaskets.
3 inch	$1.25	$1.95	$3.00	$	$0.24	$0.28	$0.02½	$0.09
4 "	1.50	2.20	3.70	* 2.00	.32	40	.02½	.10
5 "	2.00	3.10	4.80	* 2.40	40	48	.02½	.12
6 "	2.90	3.90	5.70	* 3.25	48	72	.03	.16
7 "	3.50	5.00	7.70	* 4.00	.64	96	03	.18
8 "	4.50	6.60	9.80	* 4.75	.72	1.12	03	.23
9 "	6.20	9.25	13.00	* 5.50	96	1.44	03	.31
10 "	6.80	11.50	16.50	* 7.00	1.12	1.62	.03	.40
11 "	* 8.75	*14.00	*19.00	* 8.00	1.20	2.00	.03	.45
12 "	10.50	15.00	21.00	* 9.00	1.28	2.40	03	.50
13 "	12.00	*16.50	*24.00	* 9.75	1.44	2.80	.03	.56
14 "	13.50	18.60	27.00	*11.00	1.60	3.36	03½	.63
15 "	15.00	*22.00	*31.00	*12.25	1.92	3.68	.03½	.75
16 "	17.00	25.00	34.50	*14.20	2.72	4.16	.03½	.90
18 "	*20.00	*29.00	*39.00	*17.40	3.12	5.60	.03½	1.08
20 "	*23.00	*34.00	*46.00	*19.60	3.44	7.20	.03½	1.25
22 "	*26.00	*39.00	*51.00	*22.00	5.60	8.80	.04	1.75
24 "	*30.00	*45.00	*58.00	*25.00	6.00	10.40	04	2.00

* All fittings marked thus are riveted wrought iron, all others are cast iron.

FITTINGS OF ANY DESIGN MADE TO ORDER.

THE DISKS CAN BE TAPPED TO SUIT WROUGHT IRON PIPE IF REQUIRED

REVISED CLASSIFICATION AND PRICE LIST
(SUPERSEDING ALL PREVIOUS CLASSIFICATIONS.)

MALLEABLE IRON FITTINGS
FOR STEAM, GAS AND WATER

CLASS	A	B	C	D	E
Elbows	$\frac{1}{8}\times\frac{1}{8}$ $\frac{1}{4}\times\frac{1}{8}$ $\frac{3}{8}\times\frac{1}{8}$	$\frac{1}{4}\times\frac{1}{4}$ $\frac{3}{8}\times\frac{1}{4}$ $\frac{3}{8}\times\frac{3}{8}$ $\frac{1}{2}\times\frac{1}{4}$	$\frac{1}{2}\times\frac{1}{2}$ $\frac{1}{2}\times\frac{3}{8}$	*$\frac{3}{4}$ and 1	†$1\frac{1}{4}$ and larger.
Elbows, Right and Left.	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$ and 1	*$1\frac{1}{4}$ and larger.	....
Elbows, 45°	....	$\frac{1}{2}$ and smaller.	$\frac{3}{4}$ to 2	$2\frac{1}{2}$ and larger.	....
Elbows, Street	....	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{1}{2}$ $\frac{3}{4}$ $\frac{3}{4}\times\frac{1}{2}$ $1\times\frac{3}{4}$	1 and larger.	....
Elbows, Side Outlet	....	$\frac{1}{2}$ and smaller.	$\frac{3}{4}$ and larger.	....	....
Elbows, Drop	....	$\frac{1}{2}$ and smaller.	$\frac{3}{4}$ and larger.	....	....
Tees	$\frac{1}{8}\times\frac{1}{8}$ $\frac{1}{4}\times\frac{1}{4}$ $\frac{1}{4}\times\frac{1}{8}$ $\frac{3}{8}\times\frac{1}{8}$	$\frac{1}{4}\times\frac{1}{4}$ $\frac{3}{8}\times\frac{3}{8}$ $\frac{1}{4}\times\frac{3}{8}$ $\frac{3}{8}\times\frac{1}{4}\times\frac{1}{4}$ $\frac{3}{8}\times\frac{1}{4}$ $\frac{3}{8}\times\frac{1}{4}\times\frac{3}{8}$	$\frac{1}{2}$ and $\frac{1}{2}$ Reducing.	*$\frac{3}{4}$ and 1	†$1\frac{1}{4}$ and larger.
Tees, Four-Way	....	$\frac{1}{2}$ and smaller.	$\frac{3}{4}$ and larger.	....	....
Tees, Drop	....	$\frac{1}{2}$ and smaller.	$\frac{3}{4}$ and larger.	....	....
Straight Crosses	....	$\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$	$\frac{3}{4}$ and 1	$1\frac{1}{4}$ and larger.	....
Reducing Crosses	....	1 and smaller.	....	*$1\frac{1}{4}$ and larger.	....
Rod Couplings	All sizes	....	....	....	....
Y Bends	....	$\frac{1}{2}$ and $\frac{3}{4}$	1 and larger.	....	....
Return Bends	....	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{3}{4}$ and 1	$1\frac{1}{4}$ and larger.	....
Return Bends, Right and Left	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{3}{4}$ and 1	$1\frac{1}{4}$ and larger.	....	....
Couplings, R. H	$\frac{1}{8}$	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{1}{2}$ and $\frac{3}{4}$	1 and $1\frac{1}{4}$	$1\frac{1}{2}$ and 2
Couplings, R. and L.	$\frac{1}{8}$	$\frac{1}{4}$ and $\frac{3}{8}$	$\frac{1}{2}$ and $\frac{3}{4}$	1 and larger.	....
Couplings, Reducing	$\frac{1}{4}\times\frac{1}{8}$ $\frac{3}{8}\times\frac{1}{8}$	$\frac{3}{8}\times\frac{1}{4}$ to $\frac{3}{4}\times\frac{5}{8}$	$\frac{3}{4}\times\frac{1}{2}$ to $1\times\frac{3}{4}$	*$1\frac{1}{4}$ and larger.	....
Caps	....	$\frac{1}{8}$ and $\frac{3}{8}$	$\frac{1}{2}$ to 1	$1\frac{1}{4}$ and arger.	....
Locknuts	....	$\frac{1}{4}$ to $\frac{1}{2}$	$\frac{3}{4}$ to $1\frac{1}{4}$	$1\frac{1}{2}$ and larger.	....
Extension Pieces	....	$\frac{3}{8}$ and $\frac{1}{2}$	$\frac{3}{4}$ and larger.	....	....
Waste Nuts	......	$\frac{3}{4}$ and smaller.	1 and larger.	....	....
Chandelier Hooks	....	All sizes.	....	....	....
Wall Plates	....	All sizes.	....	....	....

*Fittings in Class D having one or more outlets smaller than $\frac{3}{4}$ will be charged in Class C.
†Fittings in Class E having one or more outlets smaller than 1 will be charged in Class D

IN ORDERING BE PARTICULAR TO STATE WHETHER FOR GAS OR STEAM

PRICE LIST

CLASS	A	B	C	D	E
PRICE, Per Pound, **Black**	40	26	16	13	11
PRICE, Per Pound, Galvanized.	50	35	23	20	18

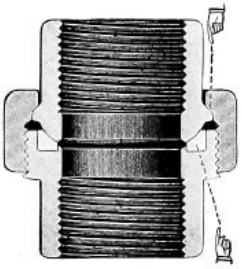
Orders for less than 25 pounds of Black Fittings in Classes B, C, D and E will be charged at a uniform price of 20 cents per pound, and in Class A at 40 cents per pound.

Above prices on Galvanized Fittings are for sizes enumerated on following pages only. Other sizes will be made to order at a special price according to quantity ordered.

JEFFERSON PATENT UNIONS.

No Packing Required.

THE STANDARD FOR HIGH AND LOW PRESSURE SERVICE.



Bronze Metal, Ground Joint Seats.

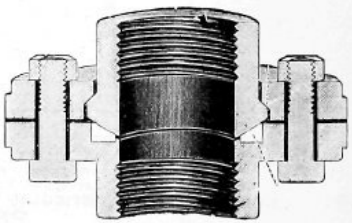
PRICE LIST.

Size.	Price Plain.	Price Galv.
¼ inch	$0 30	$0 45
⅜ "	40	60
½ "	50	75
¾ "	60	90
1 "	80	1 20
1¼ "	1 20	1 80
1½ "	1 60	2 40
2 "	2 00	3 00
2½ "	3 20	4 80
3 "	4 80	6 20

Furnished with Bolts and Nuts.

PRICE LIST.

Size.	Price.
1 inch	$ 0 80
1¼ "	1 20
1½ "	1 60
2 "	2 00
2½ "	3 20
3 "	4 80
3½ "	6 00
4 "	7 50
5 "	10 00
6 "	12 50
7 "	15 00
8 "	18 00
9 "	21 60
10 "	28 80



WROUGHT IRON NIPPLES.

CLOSE.

SHOULDER.

THREADED RIGHT HAND.

LENGTH, INCHES.						SIZES.	PRICES.		PRICES OF EXTRA LONG NIPPLES.								
									LENGTHS, INCHES.								
Close.	Short.	Long.					Close or Short.	Long.	4	5	6	7	8	9	10	11	12
$\frac{3}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{8}$	.04	.06	.07	.08	.10	.12	.14	.15	.17	.18	.19
$\frac{7}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{4}$	.04	.06	.07	.08	.10	12	.14	.15	.17	.18	.19
1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{3}{8}$	.04	.06	.07	.08	.10	.12	.14	.15	17	.18	.19
$1\frac{1}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{2}$	.05	.07	.08	.10	.12	.14	.16	.18	.20	.22	.23
$1\frac{1}{8}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$\frac{3}{4}$	.06	.09	...	.11	.13	.17	.18	.20	.22	.24	.26
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	1	.08	.13	...	.15	.18	.23	.25	.28	.31	.34	.36
$1\frac{3}{8}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{4}$	.11	.17	...	.20	.24	.29	.33	.36	.40	.44	.47
$1\frac{3}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{2}$	.13	.20	...	.25	.29	.36	.40	.45	.50	.54	.59
2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	2	.18	.27	...	.32	.38	.50	.54	.59	.65	.72	.77
$2\frac{1}{4}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$2\frac{1}{2}$	.39	.59	...	...	.68	.90	.97	1.06	1.17	1.26	1.35
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	3	.48	.72	...	...	.85	1.08	1.20	1.33	1.45	1.58	1.70
$2\frac{3}{4}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$3\frac{1}{2}$	.75	1.05	...	...	...	1.30	1.45	1.60	1.75	1.90	2.05
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	4	.85	1.20	...	...	...	1.52	1.69	1.87	2.05	2.22	2.40
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$4\frac{1}{2}$	1.25	1.70	...	...	...	2.25	2.50	2.75	2.95	3.17	3.40
$3\frac{1}{2}$	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	5	1.55	2.45	...	...	...	2.58	2.83	3.10	3.35	3.60	3.85
$3\frac{1}{2}$	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	6	1.85	2.90	...	...	...	3.05	3.35	3.70	4.00	4.30	4.65
4	5	6	...	...	...	7	3.20	3.60	...	...	...	4.05	4.45	4.90	5.30	5.75	6.15
4	5	6	...	...	...	8	3.55	4.05	...	...	...	4.55	5.05	5.50	6.00	6.50	7.00
5	6	8	...	...	...	9	5.25	6.50	...	...	...	...	...	7.10	7.75	8.40	9.00
5	6	8	...	...	...	10	6.75	8.25	...	...	...	...	...	8.90	9.70	10.40	11.15
...	...	...	...	...	...	11	...	...	...	...	...	...	...	...	...	...	...
5	6	8	...	...	...	12	8.00	10.00	...	...	...	...	...	10.80	11.75	12.70	13.65

Assorted close and short nipples will always be sent unless otherwise ordered.

WROUGHT IRON GALVANIZED NIPPLES.

THREADED RIGHT HAND.

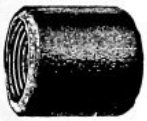
LENGTH, INCHES.						SIZES.	PRICES.		PRICES OF EXTRA LONG GALVANIZED NIPPLES.								
									LENGTHS, INCHES.								
Close.	Short.	Long.					Close or Short.	Long.	4	5	6	7	8	9	10	11	12
~~$\frac{3}{4}$~~	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{8}$	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
~~$\frac{3}{4}$~~	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{4}$	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{3}{8}$	.06	.11	.12	.15	.17	.21	.24	.26	.29	.31	.34
$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{2}$	.06	.11	.13	.16	.18	.23	.26	.28	.31	.33	.36
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$\frac{3}{4}$	.08	.14	...	.18	.21	.26	.29	.32	.35	.38	.41
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	1	.11	.19	...	.24	.28	.34	.38	.42	.47	.51	.55
$1\frac{1}{2}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{4}$	.17	.29	...	.32	.38	.45	.51	.57	.63	.69	.75
$1\frac{1}{2}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{2}$	.21	.35	...	.39	.46	.55	.63	.70	.77	.84	.91
2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	2	.27	.47	...	.52	.61	.74	.83	.93	1.03	1.13	1.23
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$2\frac{1}{2}$	.56	.86	...	...	1.00	1.26	1.41	1.56	1.71	1.86	2.01
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	3	.70	1.10	...	...	1.30	1.60	1.80	2.00	2.20	2.40	2.60
$2\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$3\frac{1}{2}$	1.20	1.70	...	...	...	2.10	2.35	2.60	2.85	3.15	3.40
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	4	1.35	1.87	...	...	...	2.30	2.60	2.90	3.20	3.50	3.80
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$4\frac{1}{2}$	1.85	2.60	...	...	...	3.30	3.65	4.05	4.45	4.85	5.25
$3\frac{1}{2}$	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	5	2.30	3.15	...	...	...	3.75	4.20	4.60	5.00	5.40	5.85
$3\frac{1}{2}$	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$6\frac{1}{2}$	6	2.80	4.25	...	...	...	4.50	5.00	5.55	6.05	6.60	7.15
4	5	6	...	...	...	7	4.25	4.95	...	...	...	5.65	6.35	7.05	7.75	8.45	9.20
4	5	6	...	...	...	8	5.00	5.80	...	...	...	6.65	7.50	8 35	9.25	10.10	10.95

WROUGHT IRON NIPPLES.

THREADED RIGHT AND LEFT.

LENGTH, INCHES.						SIZES.	PRICES.		PRICES OF EXTRA LONG R. AND L. NIPPLES.								
									LENGTHS, INCHES.								
Close.	Short.	Long.					Close or Short.	Long	4	5	6	7	8	9	10	11	12
~~$\frac{3}{4}$~~	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{8}$	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
~~$\frac{3}{4}$~~	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{4}$	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{3}{8}$	.05	.08	.09	.11	.13	.16	.18	.20	.23	.25	.27
$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{2}$	.07	.10	.11	.13	.16	.18	.21	.24	.27	.29	.31
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$\frac{3}{4}$	.08	.12	...	.15	.17	.23	.25	.27	.29	.32	.35
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	1	.11	.18	...	.20	.24	.31	.33	.37	.41	.45	.48
$1\frac{1}{2}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{4}$	.15	.23	...	.27	.32	.39	.45	.50	.55	.60	.65
$1\frac{1}{2}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{2}$	.18	.27	...	.34	.39	.48	.52	.60	.67	.72	.80
2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	2	.24	.36	...	.43	.51	.67	.72	.80	.87	.96	1.03
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$2\frac{1}{2}$	.52	.79	...	...	.91	1.20	1.30	1.40	1.55	1.68	1.80
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	3	.65	.96	...	...	1.13	1.44	1.60	1.77	1.93	2.10	2.27
$2\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$3\frac{1}{2}$	1.00	1.40	...	...	...	1.75	1.95	2.15	2.35	2.55	2.75
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	4	1.15	1.60	...	...	...	2.00	2.25	2.50	2.75	3.00	3.25

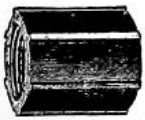
Add 60 per cent to above prices for Galvanized Nipples threaded right and left.



STANDARD

WROUGHT IRON COUPLINGS.

Size of Pipe. Inches.	Actual Outside Diameter. Inches.	Length of Coupling. Inches.	Weight of Coupling Pounds.	No. of Threads per Inch of Screw.	Black. Each.	Galvanized. Each.	Right and Left. Black. Each.	Right Hand. Faced. Each.
⅛	⅓₂	⅓₂	⅓₂	27	$0 05	$0 06	$0 07	....
¼	⅔₂	1	¹⁄₁₆	18	05	06	07	09
⅜	⅔₂	1 ³⁄₃₂	³⁄₃₂	18	06	08	08	10
½	1 ³⁄₃₂	1 ⁵⁄₁₆	⁵⁄₃₂	14	07	10	11	12
¾	1 ⅛	1 ⁹⁄₁₆	¼	14	10	13	15	16
1	1 ³¹⁄₃₂	1⅛	⅜	11½	13	18	20	22
1¼	2	1 ⅝	⁹⁄₁₆	11½	17	25	25	30
1½	2 ⁹⁄₃₂	2 ³⁄₁₆	⅓₂	11½	21	32	30	40
2	2 ⅛	2 ⅛	1¼	11½	28	40	50	50
2½	3 ⁹⁄₃₂	2 ⅛	1⅝	8	40	55	85	70
3	4 ¼	3	3 ¼	8	60	80	1 20	90
3½	4⅝	3⅛	3¼	8	80	1 05	1 60	1 20
4	5 ³⁄₃₂	3⅛	4¼	8	1 00	1 40	2 00	1 50
4½	5 ⅞	3⅛	4¼	8	1 50	2 00	....	2 10
5	6¼	3 ⅛	6¾	8	1 65	2 25	....	2 40
6	7 ⅛	3 ⅛	8½	8	2 40	3 25	....	3 60
7	8 ⅛	4 ⅝	11½	8	3 25	....	....	....
8	9 ⅞	4 ⅝	15¾	8	4 25	....	....	....
9	10 ⅛	5⅜	20¾	8	5 50	....	....	....
10	11½	6¼	26¾	8	7 50	....	....	....
12	13 ⅝	6¼	40½	8	10 00	....	....	....
14	....	....	....	....	13 00	....	....	....



MALLEABLE IRON COUPLINGS.

RIBBED, RIGHT AND LEFT.

Size.....Inches	¼	⅜	½	¾	1	1¼	1½	2
Price, Plain.....Each	$0 04	05	08	12	16	25	36	52
Price, Galvanized.....Each	06	08	10	17	25	35	55	75

PLAIN, RIGHT HAND.

Size.....Inches	¼	⅜	½	¾	1	1¼	1½	2
Price, Plain.....Each	$0 03	04	07	10	14	20	25	35
Price, Galvanized.....Each	05	07	10	17	23	30	40	55

STREET ELBOWS.

MALLEABLE IRON.

Size.....Inches	⅜	½	¾	1	1¼	1½	2	2½
Price.....Each	$0 10	12	20	25	40	55	90	1 50
Price, Galv.....Each	12	15	28	35	55	80	1 30	...

TEES.

CAST IRON.

Size.....Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Price.....Each	$0 08	08	09	12	15	23	29	41	73	1 10	1 50
Price, Galv.....Each	16	16	18	24	30	46	58	82	1 46	2 20	3 00
Size.....Inches	4	4½	5	6	7	8	9	10	12		
Price.....Each	$1 75	2 55	3 00	4 00	6 80	9 75	13 00	19 50	29 00		
Price, Galv.....Each	3 50	5 10	6 00	8 00	13 60	19 50	26 00	39 00	58 00		

MALLEABLE IRON.

Size.....Inches	⅛	¼	⅜	½	¾	1	1¼	1½
Price.....Each	$0 07	07	08	11	15	25	30	45
Price, Galvanized.....Each	.....	09	10	16	20	38	50	70

Size.....Inches	2	2½	3	3½	4	5	6	
Price.....Each	$0 60	1 05	1 70	2 50	3 40	5 00	7 00	....
Price, Galvanized.....Each	1 00	1 90	3 00	4 25	5 75	....	....	

REDUCING TEES.

CAST IRON.

Size.....Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Price.....Each	$0 10	14	17	27	33	47	83	1 25	1 75	2 00	
Size.....Inches	4½	5	6	7	8	9	10	12			
Price.....Each	$2 95	3 50	4 60	7 80	11 25	15 00	22 50	33 50			

CROSSES.

CAST IRON.

Size.....Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Price.....Each	$0 16	22	27	42	53	75	1 30	2 00	2 70	3 15	
Price, Galv.....Each	32	44	54	84	1 06	1 50	2 60	4 00	5 40	6 30	
Size.....Inches	4½	5	6	7	8	9	10	12			
Price.....Each	$4 60	5 50	7 25	12 25	17 50	23 50	35 00	52 50			
Price, Galv.....Each	9 20	11 00	14 50	24 50	35 00	47 00	70 00	105 00			

CROSSES.

MALLEABLE IRON.

Size.....Inches	⅛	¼	½	¾	1	1¼	1½	2	2½	3	3½	4
Price.....Each	$0 08	10	12	20	30	40	60	1 00	1 75	3 00	3 25	5 25
Price, Galv..Each	..	..	17	25	45	60	90	1 50	2 75	.....		

REDUCING CROSSES.

CAST IRON.

Size .....Inches	⅛	¼	½	¾	1	1¼	1½	2	2½	3	3½
Price.....Each	$0 18		25		30	46	60	83	1 45	2 20	3 00
Size .....Inches	4		4	5		6	7		8	9	10
Price.....Each	$3 50		5 10	6 00		8 00	13 50		19 25	26 00	38 50

Y BENDS.

CAST IRON.

Size.....Inches	½	¾	1	1¼	1½	2	2½	3
Price.....Each	$0 20	28	34	54	66	94	1 66	2 50
Price, Reducing.....Each	23	33	40	62	76	1 08	1 90	2 90
Size..... .....Inches	3½	4		4½	5	6	7	8
Price..... .....Each	$3 50	4 00		5 90	7 00	9 20	15 60	22 50
Price, Reducing.....Each	4 00	4 60		6 80	8 00	10 60	18 00	26 00

REDUCERS.

MALLEABLE IRON.

Size.....Inches	⅛	¼	⅜	½	¾	1	1¼
Price.....Each	$0 03	03	05	10	16	16	20
Price, Galvanized.....Each	..	.	08	15	25	25	35
Size.....Inches	1½	2	2½	3	3½	4	
Price.....Each	$0 28	45	70	1 00	1 50	1 85	
Price, Galvanized.....Each	45	75	1 05	1 65	2 40	3 05	

REDUCERS.

CAST IRON.

Size .....Inches	4	4½	5	6	7	8	9	10	12
Price..... Each	$1 35	1 85	2 00	2 70	5 35	6 75	8 35	10 00	15 00

CAPS.

CAST IRON.

Size .....Inches	3½	4	4½	5	6	7	8	9	10	12
Price.....Each	$0 75	87	1 05	1 20	1 55	2 50	2 85	4 75	5 50	7 00
Price, Galv.....Each	1 50	1 74	2 10	2 40	3 10	5 00	5 70	9 50	11 00	14 00

FLANGE UNIONS.

CAST IRON.

With Rubber Gasket.

Size.....Inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Diam. Flanges....Inches	3¼	3½	4⅜	4⅝	5¼	5⅞	6⅝	6⅞	7½	8¼
Number Bolts in each...	3	4	4	4	4	4	4	4	4	4
Price.....Each	$0 40	46	52	64	78	1 00	1 25	1 50	1 80	2 10
Price, Galv.....Each	80	92	1 04	1 28	1 56	2 00	2 50	3 00	3 60	4 20

Size.....Inches	4½	5	6	7	8	9	10	12
Diam. Flanges....Inches	9¼	10¼	12	13	14	16	18	20
Number Bolts in each...	5	5	6	7	8	8	10	10
Price.....Each	$2 70	3 15	3 95	5 50	7 00	10 00	11 50	16 00
Price, Galv.....Each	5 40	6 30	7 90	11 00	14 00	20 00	23 00	32 00

UNIONS.

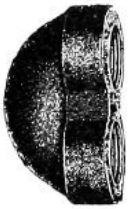
MALLEABLE IRON.

Size.....Inches	¼	⅜	½	¾	1	1¼
Price.....Each	$0 18	20	22	27	33	46
Price, Galvanized.....Each	27	30	33	40	50	70

Size.....Inches	1½	2	2½	3	3½	4
Price.....Each	$0 58	0 75	1 55	2 10	3 65	4 35
Price, Galvanized.....Each	90	1 15	2 35	3 15	5 50	6 50

RETURN BENDS.

CAST IRON.



Close Pattern. Right Hand.

Size.....Inches	½	¾	1	1¼	1½	2	2½	3
Price.....Each	$0 18	20	22	28	40	57	1 20	1 70
Distance between centers.....Inches	1¼	1½	1¾	2¼	2½	3¼	3¾	4½

RIGHT AND LEFT.

Size.....Inches	½	¾	1	1¼	1½	2	2½	3
Price, R. and L. or L. H.....Each	$0 21	23	26	33	46	66	1 40	1 95

Open Pattern.

Size.....Inches	½	1	1¼	1½	2	2½	3
Price, Right Hand.....Each	$0 26	30	40	55	80	1 35	2 20
Price, R. and L. or L. H.....Each	30	35	46	64	92	1 55	2 50

RETURN BENDS.

MALLEABLE IRON.

Close Pattern. Right Hand.

Size ..... Inches	¼	⅜	½	¾	1	1¼	1½	2
Price ..... Each	$0 13	25	35	50	75	1 00		
Price, Galvanized ..... Each	25	35	55	75	1 15	1 65		
Distance between centers ..... Inches	1	1¼	1½	1¾	2 3/16	2½		

RIGHT AND LEFT.

Size ..... Inches	¼	⅜	½	¾	1	1¼	1½	2
Price, Right and Left ..... Each	$0 15	30	45	60	90	1 25		
Price, Left Hand ..... Each	15	30	45	60	90	1 25		

Open Pattern.

Size ..... Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price ..... Each	$0 15	30	50	65	85	1 25	2 00	3 00		
Price, Galvanized ..... Each	25	45	70	90	1 25	2 00	3 50	5 00		
Distance between centers ..... Inches	1¼	2	2½	3	3½	4	4½	5		

RIGHT AND LEFT.

Size ..... Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price, Right and Left ..... Each	$0 20	38	60	80	1 05	1 55	2 50	3 75		
Price, Left Hand ..... Each	20	38	60	80	1 05	1 55	2 50	3 75		

BUSHINGS.

CAST IRON.

Reducing two or more sizes, up to 2½ inch inclusive.
Reducing one or more sizes, 3 inch and up.

Size ..... Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Price ..... Each	$0 04	05	06	07	09	14	21	30	40	
Price, Galv ..... Each	08	10	12	14	18	28	42	60	80	
Size ..... Inches	4	4½	5	6	7	8	9	10	12	
Price ..... Each	$0 50	75	93	1 25	1 87	2 75	3 25	3 75	5 00	
Price, Galv ..... Each	1 00	1 50	1 85	2 50	3 75	5 50	6 50	7 50	10 00	

MALLEABLE IRON.

Size, Inches	⅛	¼	⅜	½	¾	1	1½	2	2½
Each	.04	.04	.05	.06	.07	.09	.14	.21	
Galvanized, Each	.08	.08	.10	.12	.14	.18	.28	.42	

FACED BUSHINGS.

MALLEABLE IRON.

Reducing one size only.

CAST IRON.

Reducing two or more sizes.

CAST-IRON FITTINGS.

LONG RADIUS ELLS.

Size, Inches	1	1¼	1½	2	2½	3	3½	4
Straight, Each	.32	.40	.55	.80	1.20	2.25	3.25	3.50
Reducing, Each	.48	.60	.83	1.20	1.80	3.38	4.88	5.25
Size, Inches	4½	5	6	7	8	9	10	12
Straight, Each	5.50	6.50	8.75	13.00	17.00	25.50	30.00	40.00
Reducing, Each	8.25	9.75	13.13	19.50	25.50	38.25	45.00	60.00

LONG RADIUS DOUBLE BRANCH ELLS.

Size, Inches	1	1¼	1½	2	2½	3	3½	4
Straight, Each	.64	.80	1.10	1.60	2.40	4.50	6.50	7.00
Reducing, Each	.96	1.20	1.65	2.40	3.60	6.75	9.75	10.50
Size, Inches	4½	5	6	7	8	9	10	12
Straight, Each	11.00	13.00	17.50	26.00	34.00	51.00	60.00	80.00
Reducing, Each	16.50	19.50	26.25	39.00	51.00	76.50	90.00	120.00

LONG RADIUS TEES.

Size, Inches	1	1¼	1½	2	2½	3	3½	4
Straight, Each	48	.60	.82	1.20	1.80	3.40	4.90	5.25
Reducing, Each	.72	.90	1.23	1.80	2.70	5.10	7.35	7.88
Size, Inches	4½	5	6	7	8	9	10	12
Straight, Each	8.25	9.75	13.25	19.50	25.50	38.00	45.00	60.00
Reducing, Each	12.38	14.63	19.88	29.25	38.25	57.00	67.50	90.00

LONG RADIUS CROSSES.

Size, Inches	1	1¼	1½	2	2½	3	3½	4
Each	.85	1.10	1.50	2.15	3.20	6.00	8.75	9.50
Size, Inches	4½	5	6	7	8	9	10	12
Each	15.00	17.50	24.00	35.00	45.00	68.00	80.00	107.00

CAST-IRON

ELBOWS.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
R. H., Each	.05	.05	.06	.08	.10½	.16	.20	.28	.50	.75
R. H. Galv., Each	.10	.10	.12	.16	.21	.32	.40	.56	1.00	1.50
R. and L., Each	.06	.06	.07	.09	.12	.18	.23	.32	.60	.85
Pitched, Each	.....	.....	.....	.10	.13	.20	.25	.35	.65	1.00

Size, Inches	3½	4	4½	5	6	7	8	9	10	12
R. H., Each	1.05	1.20	1.75	2.00	2.75	4.70	6.75	9.00	13.50	20.00
R. H. Galv., Each	2.10	2.40	3.50	4.00	5.50	9.40	13.50	18.00	27.00	40.00
Pitched, Each	1.30	1.50	.....	.....	.....	.....	.....	.....	.....	.....

MALLEABLE IRON

Size, Inches	⅛	¼	⅜	½	¾	1	1¼	1½
R. H., Each	.04	.04	.06	.10	.15	.22	.25	.35
R. and L., Each	.....	.05	.07	.12	.17	.25	.30	.40
Galvanized, R. H., Each	.....	.05	.08	.14	.20	.32	.40	.60

Size, Inches	2	2½	3	3½	4	5	6	
R. H., Each	.50	.80	1.50	2.25	3.00	4.00	5.00	.....
R. and L., Each	.65	.....	.....	.....	.....	.....	.....	.....
Galvanized, R. H., Each	.90	1.35	2.60	3.75	5.00	.....	.....	.....

45° ELBOWS.

CAST IRON.

Size, Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½
Each	.06	.07	.10	.12	.19	.24	.34	.60	.90	1.25
Galv., Each	.12	.14	.20	.24	.38	.48	.68	1.20	1.80	2.50

Size, Inches:	4	4½	5	6	7	8	9	10	12	14
Each	1.45	2.20	2.50	3.45	5.90	8.50	11.25	17.00	25.00	50.00
Galv., Each	2.90	4.40	5.00	6.90	11.80	17.00	22.50	34.00	50.00	100.00

MALLEABLE IRON.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Each	.08	.10	.12	.18	.26	.36	.54	.82	1.25	2.50	2.25	4.50
Galvanized, Each	.12	.15	.20	.25	.40	.50	.85	1.35	....	....	....	....

REDUCING ELBOWS.

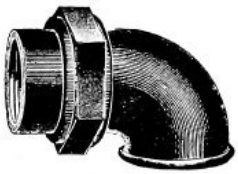
CAST IRON.

Size, Inches	½	¾	1	1¼	1½	2	2½	3	3½
Each	.07	.09	.12	.18	.23	.32	.60	.85	1.20
Galv., Each	.14	.18	.24	.36	.46	.64	1.20	1.70	2.40

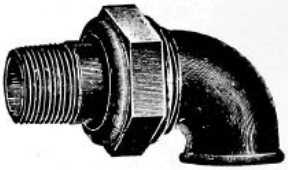
Size, Inches	4	4½	5	6	7	8	9	10	12
Each	1.40	2.00	2.30	3.15	5.40	7.75	10.50	15.50	23.00
Galv., Each	2.80	4.00	4.60	6.30	10.80	15.50	21.00	31.00	46.00

MALLEABLE IRON FITTINGS.

UNION ELBOWS.



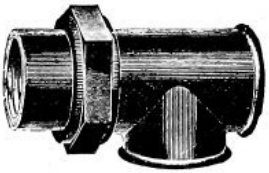
WITH FEMALE UNION.



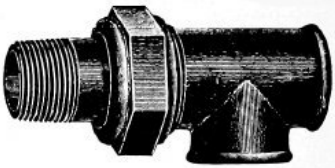
WITH MALE UNION.

Size, Inches	½	¾	1	1¼	1½	2	2½
With Female Union, Each	.42	.54	.63	.90	1.05	1.55	2.85
With Female Union, Galvanized, Each	.63	.81	.95	1.35	1.58	2.35	4.30
With Male Union, Each	.48	.62	.72	1.05	1.20	1.80	3.30
With Male Union, Galvanized, Each	.72	.93	1.08	1.60	1.80	2.70	4.95

UNION TEES.



WITH FEMALE UNION.



WITH MALE UNION

Size, Inches	½	¾	1	1¼	1½	2	2½
With Female Union, Each	45	.57	.70	.95	1.15	1.70	3 20
With Female Union, Galvanized, Each	.68	.86	1.05	1.45	1.75	2.55	4.80
With Male Union, Each	.52	.65	.80	1.10	1.30	1.95	3.70
With Male Union, Galvanized, Each	.78	1.00	1.20	1.65	1.95	2.95	5.55

CAST-IRON FITTINGS.

FLANGED.

LONG RADIUS TEES.

FLANGED.

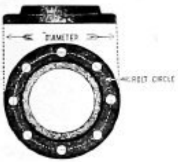
LONG RADIUS REDUCING TEES.

Size. Inches.	Center to Face. Inches.	Face to Face. Inches.	Diameter of Flanges. Inches.	STRAIGHT SIZES. PRICE. With Faced Flanges. Each.	STRAIGHT SIZES. PRICE. With Faced and Drilled Flanges. Each.	REDUCING SIZES. Size. Inches.	REDUCING SIZES. PRICE. With Faced Flanges. Each.	REDUCING SIZES. PRICE. With Faced and Drilled Flanges. Each.
2	4½	9	6	8.00	9.50	4	13.75	16.75
3	5½	11	7½	9.50	11.25	4½	17.25	20.25
4	6½	13	9	12.00	15.00	5	18.75	21.75
4½	7	14	9¼	15.00	18.00	6	23.00	26.00
5	7½	15	10	16.25	19.25	7	30.00	35.50
6	8	16	11	20.00	23.00	8	38.50	44.00
7	8½	17	12½	26.50	32.00	9	50.00	56.50
8	9½	19	13½	33.50	39.00	10	61.50	68.00
9	10¾	21½	15	43.50	50.00	12	85.00	94.00
10	11½	23	16	53.50	60.00	14	110.00	121.00
12	12¾	25½	19	74.00	83.00	15	138.00	150.00
14	13¼	26½	21	96.00	107.00	16	160.00	173.00
15	14½	29	22	120.00	132.00	18	205.00	220.00
16	15¼	30½	23½	140.00	153.00	20	258.00	278.00
18	16½	33	25	178.00	193.00	22	305.00	335.00
20	18	36	27½	225.00	245.00	24	385.00	415.00
22	20	40	29½	265.00	295.00			
24	22	44	31½	335.00	365.00			

FLANGED.

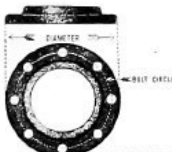
DOUBLE LONG RADIUS TEES.

Size. Inches.	Center to Face. Inches.	Face to Face. Inches.	Diameter of Flanges. Inches.	STRAIGHT SIZES. PRICE. With Faced Flanges. Each.	STRAIGHT SIZES. PRICE. With Faced and Drilled Flanges. Each.	REDUCING SIZES. Size. Inches.	REDUCING SIZES. PRICE. With Faced Flanges. Each.	REDUCING SIZES. PRICE. With Faced and Drilled Flanges. Each.
4	6½	13	9	12.00	15.00	4	13.75	16.75
5	7½	15	10	16.25	19.25	5	18.75	21.75
6	8	16	11	20.00	23.00	6	23.00	26.00
7	8½	17	12½	26.50	32.00	7	30.00	35.50
8	9½	19	13½	33.50	39.00	8	38.50	44.00
9	10¾	21½	15	43.50	50.00	9	50.00	56.50
10	11½	23	16	53.50	60.00	10	61.50	68.00
12	12¾	25½	19	74.00	83.00	12	85.00	94.00
14	13¼	26½	21	96.00	107.00	14	110.00	121.00
15	14½	29	22	120.00	132.00	15	138.00	150.00
16	15¼	30½	23½	140.00	153.00	16	160.00	173.00
18	16½	33	25	178.00	193.00	18	205.00	220.00
20	18	36	27½	225.00	245.00	20	258.00	278.00
22	20	40	29½	265.00	295.00	22	305.00	335.00
24	22	44	31½	335.00	365.00	24	385.00	415.00



FLANGES AND TEMPLATES FOR DRILLING.

Size. Inches.	Diameter of Flanges. Inches.	CHICAGO STANDARD. Bolt Circle. Inches.	CHICAGO STANDARD. Number of Bolts.	CHICAGO STANDARD. Size of Bolts.	MASTER STEAM FITTERS' STANDARD. Bolt Circle. Inches.	MASTER STEAM FITTERS' STANDARD. Number of Bolts.	MASTER STEAM FITTERS' STANDARD. Size of Bolts.
2	6	4¾	4	⅝	4¾	4	½
2½	7	5½	4	⅝	5½	4	½
3	7½	6	4	⅝	6	4	½
3½	8½	6¾	4	⅝	7	4	½
4	9	7¼	8	⅝	7½	4	⅝
4½	9¼	7¾	8	⅝	7¾	8	⅝
5	10	8½	8	⅝	8½	8	⅝
6	11	9½	8	⅝	9½	8	⅝
7	12½	11	12	¾	10¾	8	⅝
8	13½	12	12	¾	11¾	8	¾
9	15	13	12	¾	13¼	12	¾
10	16	14¼	12	¾	14¼	12	¾
12	19	17	16	¾	17	12	¾
14	21	18¾	16	⅞	18¾	12	⅞
16	23½	21¼	20	⅞	20	16	⅞
18	25	22¾	20	⅞	21¼	16	⅞
20	27½	24¾	20	1	22¾	16	1
22	29½	27¼	24	1	25	20	1
24	31½	29½	24	1	27¼	20	1



BLIND FLANGES

STANDARD FLANGES.

FACED AND DRILLED.

FACED FLANGES.

Size. Inches.	PRICE. Faced. Each.	PRICE. Faced and Drilled. Each.
2 x 6	1.20	1.50
2½ x 7	1.40	2.00
3 x 7½	1.60	2.25
3½ x 8½	1.80	2.50
4 x 9	2.15	3.00
4½ x 9¼	2.50	3.35
5 x 10	2.80	3.65
6 x 11	3.20	4.00
7 x 12½	4.35	5.75
8 x 13½	5.00	6.50
9 x 15	6.75	8.25
10 x 16	7.75	9.25
12 x 19	10.50	12.50
14 x 21	13.75	16.00
16 x 23½	22.50	26.00

FACED BLIND FLANGES.

Size. Inches.	PRICE. Faced. Each.	PRICE. Faced and Drilled. Each.
2 x 6	1.40	1.70
2½ x 7	1.60	2.20
3 x 7½	1.85	2.50
3½ x 8½	2.10	2.80
4 x 9	2.50	3.35
4½ x 9¼	2.90	3.75
5 x 10	3.25	4.10
6 x 11	3.70	4.50
7 x 12½	5.00	6.40
8 x 13½	5.75	7.25
9 x 15	7.75	9.25
10 x 16	9.00	10.60
12 x 19	14.00	16.00
14 x 21	17.50	19.75
16 x 23½	28.00	31.50
18 x 25	33.00	36.50
20 x 27½	36.00	40.00
22 x 29½	41.00	46.00
24 x 31½	50.00	55.00

CAST-IRON FITTINGS.

FLANGED.

ELBOWS.

Size. Inches.	Center to Face. Inches.	Diameter of Flanges. Inches.	PRICE. With Faced Flanges. Each.	PRICE. With Faced and Drilled Flanges. Each.
2	4½	6	4.75	5.75
3	5½	7½	5.25	7.00
4	6½	9	7.25	9.25
4½	7	9½	9.00	11.00
5	7½	10	9.75	11.75
6	8	11	12.00	14.00
7	8½	12½	16.00	19.25
8	9½	13½	20.00	23.75
9	10½	15	26.00	30.00
10	11½	16	32.00	36.00
12	12½	19	44.00	50.00
14	13½	21	58.00	65.00
15	14½	22	72.00	80.00
16	15½	23½	84.00	93.00
18	16½	25	108.00	118.00
20	18	27½	135.00	148.00
22	20	29½	160.00	180.00
24	22	31½	200.00	220.00

45° ELBOWS.

Size. Inches.	Center to Face. Inches.	Diameter of Flanges. Inches.	PRICE. With Faced Flanges. Each.	PRICE. With Faced and Drilled Flanges. Each.
2	2½	6	5.25	6.25
3	3½	7½	6.25	7.50
4	4½	9	8.00	10.00
4½	4¾	9½	10.00	12.00
5	4¾	10	10.75	12.75
6	5½	11	13.00	15.00
7	6½	12½	16.00	19.75
8	7½	13½	20.00	23.75
9	8½	15	26.00	30.00
10	9½	16	32.00	36.00
12	10½	19	44.00	50.00
14	11½	21	58.00	65.00
15	12½	22	72.00	80.00
16	13½	23½	84.00	93.00
18	14½	25	108.00	118.00
20	15½	27½	133.00	148.00
22	16½	29½	160.00	180.00
24	17½	31½	200.00	220.00

TEES.

Size. Inches.	Center to Face. Inches.	Face to Face. Inches.	Diameter of Flanges. Inches.	STRAIGHT SIZES. PRICE. With Faced Flanges. Each.	STRAIGHT SIZES. PRICE. With Faced and Drilled Flanges. Each.
2	4½	9	6	7.00	8.50
3	5½	11	7½	8.25	10.00
4	6½	13	9	10.50	13.50
4½	7	14	9½	13.00	16.00
5	7½	15	10	14.25	17.25
6	8	16	11	17.50	20.50
7	8½	17	12½	23.00	28.75
8	9½	19	13½	29.00	34.75
9	10½	21½	15	38.00	44.00
10	11½	23	16	46.50	52.50
12	12½	25½	19	64.00	73.00
14	13½	26½	21	84.00	96.00
15	14½	29	22	105.00	117.00
16	15½	30½	23½	122.00	135.00
18	16½	33	25	155.00	170.00
20	18	36	27½	195.00	215.00
22	20	40	29½	230.00	260.00
24	22	44	31½	290.00	320.00

REDUCING TEES

Size. Inches.	REDUCING SIZES. PRICE. With Faced Flanges. Each.	REDUCING SIZES. PRICE. With Faced and Drilled Flanges. Each.
4	12.00	15.00
4½	15.00	18.00
5	16.25	19.25
6	20.00	23.00
7	26.50	32.00
8	33.50	39.00
9	43.50	50.00
10	53.50	60.00
12	74.00	83.00
14	96.00	107.00
15	120.00	132.00
16	140.00	153.00
18	178.00	193.00
20	225.00	245.00
22	265.00	285.00
24	335.00	365.00

Y BRANCHES.

FLANGED.

Size. Inches.	Diameter of Flanges. Inches.	STRAIGHT SIZES. PRICE. With Faced Flanges. Each.	STRAIGHT SIZES. PRICE. With Faced and Drilled Flanges. Each.
2	6	9.50	11.50
3	7½	11.50	14.00
4	9	14.50	18.50
4½	9½	18.00	22.00
5	10	19.50	23.50
6	11	24.00	28.00
7	12½	32.00	39.50
8	13½	40.00	47.50
9	15	52.00	60.00
10	16	64.00	72.00
12	19	88.00	100.00
14	21	116.00	130.00
15	22	144.00	160.00
16	23½	168.00	186.00
18	25	216.00	236.00
20	27½	270.00	296.00
22	29½	320.00	360.00
24	31½	400.00	440.00

Size. Inches.	REDUCING SIZES. PRICE. With Faced Flanges. Each.	REDUCING SIZES. PRICE. With Faced and Drilled Flanges. Each.
2	11.00	13.00
3	13.25	15.75
4	16.75	20.75
4½	20.75	25.00
5	22.50	26.50
6	27.50	37.50
7	37.00	45.00
8	46.00	53.50
9	60.00	68.00
10	74.00	82.00
12	100.00	112.00
14	132.00	146.00
15	165.00	180.00
16	193.00	210.00
18	248.00	268.00
20	310.00	335.00
22	370.00	410.00
24	460.00	500.00

CROSSES.

FLANGED.

Size. Inches.	Face to Face. Inches.	Diameter of Flanges. Inches.	STRAIGHT SIZES. PRICE. With Faced Flanges. Each.	STRAIGHT SIZES. PRICE. With Faced and Drilled Flanges. Each.
2	9	6	9.50	11.50
3	11	7½	11.50	14.00
4	13	9	14.50	18.50
4½	14	9½	18.00	22.00
5	15	10	19.50	23.50
6	16	11	24.00	28.00
7	17	12½	32.00	39.50
8	19	13½	40.00	47.50
9	21½	15	52.00	60.00
10	23	16	64.00	72.00
12	25½	19	88.00	100.00
14	26½	21	116.00	130.00
15	29	22	144.00	160.00
16	30½	23½	168.00	186.00
18	33	25	216.00	236.00
20	36	27½	270.00	296.00
22	40	29½	320.00	360.00
24	44	31½	400.00	440.00

Size. Inches.	REDUCING SIZES. PRICE. With Faced Flanges. Each.	REDUCING SIZES. PRICE. With Faced and Drilled Flanges. Each.
2	11.00	13.00
3	13.25	15.75
4	16.75	20.75
4½	20.75	25.00
5	22.50	26.50
6	27.50	37.50
7	37.00	45.00
8	46.00	53.50
9	60.00	68.00
10	74.00	82.00
12	100.00	112.00
14	132.00	146.00
15	165.00	180.00
16	193.00	210.00
18	248.00	268.00
20	310.00	335.00
22	370.00	410.00
24	460.00	500.00

Flanged Fittings will always be furnished *faced only*, unless otherwise ordered.
Dimensions given are Chicago Standard. If Eastern Standard required, specify.

CAST-IRON FITTINGS.

BRANCH TEES.

NO. 1. FOR CIRCULATION.

NO. 2. FOR CIRCULATION.

NO. 3. FOR BOX COILS.

All openings in Branch Tees for Circulation are tapped Right hand.

Branch Tees for Box Coils are always tapped Left hand in branches and Right hand in back inlet.

No. of Branches.	1 IN. BRANCH TEES.			1¼ IN. BRANCH TEES.			1½ IN. BRANCH TEES.			2 IN. BRANCH TEES.		
	2½ in. Center to Center.			3 in. Center to Center.			3½ in. Center to Center.			4½ in. Center to Center.		
	1 in. or 1¼ in. Run.	1½ in. Run.	2 in. Run.	1¼ in. or 1½ in. Run.	2 in. Run.	2½ in. Run.	1½ in. or 2 in. Run.	2½ in. Run.	3 in. Run.	2 in. Run.	2½ in. or 3 in. Run.	3½ in. Run.
2	.90	1.00	1.15	------	------	------	------	------	------	------	------	------
3	1.05	1.15	1.35	1.65	1.90	2.40	2.70	3.45	3.80	5.25	5.75	6.25
4	1.15	1.30	1.60	2.00	2.40	2.85	3.35	4.15	4.60	6.40	7.00	7.75
5	1.35	1.45	1.85	2.40	2.90	3.55	4.00	5.00	5.50	7.65	8.50	9.25
6	1.60	1.75	2.10	2.80	3.30	3.95	4.65	5.75	6.25	8.80	9.75	10.75
7	1.90	2.20	2.45	3.20	3.90	4.20	5.25	6.50	7.25	10.60	11.75	13.00
8	2.20	2.45	2.75	3.60	4.50	4.95	5.85	7.00	7.75	11.50	12.75	14.00
9	2.65	2.90	3.40	4.30	5.25	6.15	6.50	8.25	9.00	12.25	13.50	15.00
10	------	3.30	4.00	4.80	5.85	6.85	7.60	9.25	10.00	13.50	15.00	16.50
11	------	4.50	4.80	5.00	6.25	7.25	8.00	9.75	10.75	------	------	------
12	------	4.75	5.10	5.25	6.50	7.65	8.50	10.50	11.50	------	------	------
13	------	5.50	6.00	6.00	7.00	8.25	------	------	------	------	------	------
14	------	7.00	7.25	6.75	7.75	9.00	------	------	------	------	------	------
15	------	7.50	7.75	7.50	8.50	9.75	------	------	------	------	------	------
16	------	8.00	8.25	8.50	9.50	10.75	------	------	------	------	------	------

1-inch Branch Tees, 1-inch or 1¼-inch run, are 1⅞ inches Inside diameter.

1-inch Branch Tees, 1½-inch or 2-inch run, are 2¼ inches Inside diameter.

1¼-inch Branch Tees are all 2⅛ inches Inside diameter.

1½-inch Branch Tees are all 2¾ inches Inside diameter

2-inch Branch Tees are all 3⅛ inches Inside diameter.

Always order Branch Tees by size and number.

1-inch Branch Tees, 1-inch and 1¼-inch run, are also made 2¼-inch Inside diameter, as *Large Pattern.*

PLUGS.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Each	.02	.02	.02	.03	.04	.05	.07	.10	.18	.25
Galvanized, Each	.04	.04	.04	.06	.08	.10	.14	.20	.36	.50
Countersunk, Each	....	....	.04	.06	.08	.09	.11	.15	.....	....
Left Hand, Each	....	....	....	.06	.08	.09	.11	.15	.....	....
Solid	.04	.04	.04	.06	.08	.09	.11	.15	.27	.38

Size, Inches	3½	4	4½	5	6	7	8	9	10	12
Each	.38	.42	.65	.88	1.20	1.85	2.75	3.25	3.75	5.00
Galvanized, Each	.76	.84	1.30	1.75	2.40	3.70	5.50	6.50	7.50	10.00
Solid	.57	.63	1.00	1.35	1.80	2.80	4.15	5.00	5.75	7.50

LOCK NUTS.

CAST IRON.

Size, Inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Each	.25	.27	.34	.47	.64	.85	.90	1.30	1.70	2.35	2.70	3.00	4.00
Galv., Each	.50	.54	.68	.94	1.28	1.70	1.80	2.60	3.40	4.70	5.40	6.00	8.00

MALLEABLE IRON.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2
Each	.02	.03	.04	.05	.07	.09	.11	.18
Galvanized, Each	.03	.04	.05	.07	.10	.14	.20	.30

DRIVE CAPS.

Size, Inches	1	1¼	1½	2	2½	3	3½	4
Each	.26	.35	.42	.60	1.10	2.00	2.70	3.80

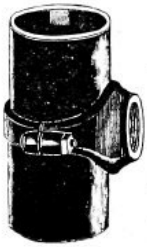
LONG SCREWS,

WITH COURLING AND LOCK-NUT FACED.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Standard Length, Inches	2½	3	3½	4	4½	5	5½	6	7	8
Standard Length, Each	.30	.35	.40	.55	.75	1.00	1.30	1.70	2.70	3.70

WATER PIPE CLAMPS.

MALLEABLE IRON.



FOR STANDARD SCREWED OR SHEET IRON PIPE.

Size of Pipe, Inches	2	2½	3	3	4	4	4	5	5
Tapped for Pipe, Inches	½ to 1	1 to 1¼	¾ to 1	1¼ to 2	¾ to 1½	2	3	¾ to 1½	2
Each	1.00	1.25	1.25	1.50	1.75	2.00	4.00	1.80	2.15
Size of Pipe, Inches	5	6	6	6	7	7	7	8	8
Tapped for Pipe, Inches	3	¾ to 1½	2	3	¾ to 1½	2	3	2 to 3	4
Each	4.00	2.25	2.50	5.00	2.50	2.70	5.00	5.50	6.00

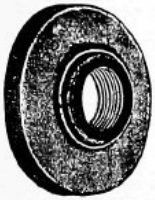
CAPS.

MALLEABLE IRON.

Size.....Inches	¼	⅜	½	¾	1	1¼
Price.....Each	$0 03	04	05	08	12	16
Price, Galvanized.....Each	04	05	08	12	17	24

Size.....Inches	1½	2	2½	3	3½	4
Price.....Each	$0 24	32	45	85	1 00	1 20
Price, Galvanized.....Each	38	52	76	1 30	1 60	2 00

CAST IRON FLANGES.



SIZE OF PIPE, INCHES

Diam. Flange, Inches.	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14
3	10	10																		
3½	15	15	15	15	16															
4	22	22	22	16	16															
4½	25	25	25	25	25	22														
5	35	35	30	30	30	30	35													
5½	45	45	45	40	40	40	35	40												
6	50	50	50	42	40	40	42	42	50											
6½		65	60	60	60	55	50	50	50	65										
7		75	75	75	70	70	62	62	62	75										
7½		90	90	90	85	85	80	80	75	85	90									
8		1 00	1 00	1 00	95	95	90	90	90	90	90									
8½		1 25	1 25	1 25	1 15	1 15	1 10	1 10	1 10	1 00	1 00									
9				1 35	1 35	1 35	1 30	1 25	1 15	1 15	1 15	1 15	1 40							
9½					1 90	1 90	1 75	1 75	1 60	1 60	1 60	1 25	1 50	1 50						
10					2 25	2 25	2 15	2 00	1 80	1 50	1 50	1 50	1 50	1 50						
11							2 50	2 50	2 25	2 25	2 00	1 75	1 75	1 75	2 20					
12								3 00	3 00	2 75	2 50	2 50	2 20	2 20	2 20	2 80				
13									3 50	3 50	3 25	3 00	3 00	2 80	2 80	2 80				
14									4 00	4 00	3 75	3 75	3 50	3 25	3 25	3 25	3 75	4 00		
15															4 00	4 00	4 00	4 50		
16															5 00	5 00	5 00	5 00	6 00	
17															6 50	6 50	5 75	6 75	7 00	
18																8 00	8 00	7 00	7 00	
19																		7 50	7 50	
20																			8 50	8 50
21																				9 50

The above is considered a complete list. Other sizes made to order.

OFFSETS. CAST IRON.

Size.....Inches	½	1	1¼	1½	2	2½	3	3½	4
Price, to offset 4 inches. Each	$0 45	70	1 00	1 20	1 80	3 00	4 00	5 00	6 00
Price, to offset 6 inches. Each	67	1 05	1 50	1 80	2 70	4 50	6 00	7 50	9 00
Price, to offset 8 inches. Each	90	1 40	2 00	2 40	3 60	6 00	8 00	10 00	12 00

BRASS STEAM FITTINGS.

IRON PIPE SIZE.

ROUGH.

Size, Inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Ells	.12	.17	21	.28	.35	.50	.85	1 10	1.50	3.50	4 50	7 00	10 00
Ells, 45°	...	.25	.30	.40	.50	.75	1.25	1.65	2.25	5.25	6.75	...	...
Ells, Street	...	...	.35	.55	.75	1.00	1.80	2.50	3.25	...	...	...	...
Ells, Reducing	...	.22	.26	.35	.45	.62	1.10	1.40	1.90	4 40	5.65	8 75	12.50
Ells, Drop, Female	...	.20	.30	40	.60	.85	1.20	1.90	2.50	...	...	...	...
Ells, Side Outlet	...	...	.30	.40	.60	.85	1.20	1.60	...	...	...	...	...
Tees	.15	.20	.30	.40	.50	.75	1.00	1.30	1.75	4.00	5.50	9.00	13.00
Tees, Reducing	...	.25	.38	.50	.63	.95	1.25	1.65	2.20	5 00	6.90	11 25	16.25
Tees, Drop, Female	...	...	.35	.45	.70	1.05	...	...	...	...	...	...	...
Tees, 4-Way	...	...	...	.50	.70	1.00	1.35	1.80	...	...	...	...	...
Crosses	.20	.30	.40	.50	.60	.80	1.50	2.00	3 50	5.00	7.00	10 00	14.50
Crosses, Reducing	...	.38	.50	.65	75	1.00	1.90	2.50	4.40	6.25	8.75	12 50	18.00
Bushings	...	.10	.12	.14	.21	.38	.50	.67	1.00	1.50	2.50	...	...
Plugs	.09	.10	.12	.15	.20	.28	.40	50	.90	1.25	2.00	3.00	4.00
Caps	.15	.15	.20	.25	.35	.45	.60	.80	1.10	2.00	3.00	...	...
Lock Nuts	...	.10	.12	.15	.20	.30	.45	.70	.95	1.50	2.75	...	...
Reducers	...	.16	.22	.32	.45	.65	.90	1.12	1.85	3.00	4.50	...	...
Couplings	.10	.14	.16	.25	.37	.50	.60	.90	1.35	2.40	3.50	...	...
Couplings, R. & L.	...	.17	20	.30	.45	.60	.75	1.12	1.75	...	...	...	...
Return Bends	...	...	...	.60	.80	1.15	1.75	2.50	3.50	...	...	...	...
Unions, Ground Joints	.35	.40	.55	.75	1.00	1.40	1.90	2.75	4.00	6 50	8 50	...	...

FINISHED.

Size, Inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Ells	.24	.34	.42	.56	.70	1.00	1.70	2.20	3.00	7.00	9.00	14.00	20.00
Ells, 45°	...	.42	.50	.68	.85	1.25	2.10	2.75	3,75	8.75	11 00	...	...
Ells, Street	...	...	.56	.83	1.10	1.50	2.65	3.60	4.75	...	...	...	...
Ells, Reducing	...	.44	.52	.70	.90	1.25	2.20	2.80	3.80	8 80	11.30	17.50	25.00
Ells, Drop, Female	...	.40	.60	.80	1.20	1.70	2 40	3.80	5.00	...	...	...	...
Ells, Side Outlet	...	...	.60	.80	1 20	1.70	2.40	2.20	...	...	...	...	...
Tees	.30	.40	60	.80	1 00	1.50	2.00	2.60	3.50	8.00	11.00	18.00	26.00
Tees, Reducing	...	.50	76	1.00	1.25	1.90	2.50	3.30	4.40	10.00	13.80	22.50	32.50
Tees, Drop, Female	...	...	.70	90	1.40	2.10	...	...	...	...	...	...	...
Tees, 4-Way	...	...	...	1.00	1.40	2.00	2.70	3.60	...	...	...	...	...
Crosses	.40	.60	.80	1.00	1.20	1.60	3.00	4.00	7.00	10.00	14.00	20.00	29.00
Crosses, Reducing	...	.75	1.00	1.30	1 50	2.00	3.80	5.00	8.80	12.50	17.50	25.00	36.00
Bushings	...	.20	.24	.28	.42	76	1.00	1.35	2.00	3.00	5.00	...	...
Plugs	.18	.20	.24	30	.40	.56	.80	1.00	1.80	2.50	4.00	6.00	8.00
Caps	.30	.30	40	.50	.70	.90	1 20	1.60	2.20	4.00	6.00	...	...
Lock Nuts	...	.20	24	.30	40	60	90	1.40	1.90	3 00	5.50	...	...
Reducers	...	.32	.44	.64	90	1.30	1.80	2.25	3.70	6.00	9.00	...	...
Couplings	20	.28	32	50	75	1 00	1.20	1.80	2.70	4 80	7.00	...	...
Couplings, R. & L.	...	31	36	55	82	1.10	1.35	2.00	3.10	...	...	...	...
Return Bends	...	...	...	1 20	1 60	2.30	3 50	5.00	7.00	...	...	...	...
Unions, Ground Joints	.32	.36	50	70	90	1 25	1 70	2 50	3.60	6.00	7 75	...	...
Nipples, Close	.12	15	20	25	30	40	60	90	1.25	2.50	3.50	...	...
Nipples, Long	.15	20	30	35	45	60	90	1.25	1.60	3 00	4.50	...	...

BRASS EXPANSION JOINTS.

SCREWED STANDARD TRAVERSE.

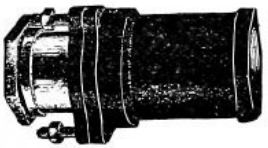
Size ..... Inches	½	¾	1	1¼	1½	2	2½	3
Traverse ..... Inches	2	2¼	2¼	2¼	2¼	2½	2½	2¼
Price ..... Each	$1.50	2·20	2.75	4.00	5.00	8.00	17.50	24.00

SCREWED SPECIAL TRAVERSE.

Size ..... Inches	¾	1	1¼	1½	2	2½
Traverse 6 Inches ..... Each	$8.25	9.00	10.00	11.50	13.50	24.00
" 8 " ..... "	9.00	10.00	11.25	13.00	15.50	
" 10 " ..... "	9.75	11.00	12.50	14.50	17.50	
" 12 " ..... "	10.50	12.00	13.75	16.00	19.50	

IRON BODY EXPANSION JOINTS.

BRASS MOUNTED.



Size ..... Inches	2	2½	3	3½	4	5	6	7	8	9	10	12
Traverse	2¼	2¼	2¾	3	3¼	4	5	6	7	7	7	8
Screwed ..... Each.	$7.50	8.00	10.00	14.00	18.00	38.00	45.00	70.00	100.00	110.00	160.00	225.00
Flanged ..... "	$10.00	16.00	18.50	25.00	30.00	48.00	65.00	80.00	110.00	120.00	175.00	250.00
Diameter of Flanges..Inches.	6	7	7½	8½	9	10	11	12½	13½	15	16	19

6-INCH TRAVERSE.

Size ..... Inches	2	2½	3	3½	4	4½	5	6
Screwed ..... Each.	$11.00	13.00	17.50	25.00	30.00	40.00	45.00	55.00
Flanged ..... "	$18.00	20.00	25.00	35.00	40.00	50.00	55.00	65.00

IRON FOOT VALVES.

WITH STRAINERS.

Size ..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	14	16
Screwed ..... Each	$1.15	1.30	1.40	1.90	2.40	3.30	3.90	5.60	7.30	10.60	11.25	14.75	35.00	41.00	64.00	100.00	.....	.....
Flanged ..... "	.....	.....	.....	.....	3.50	4.50	5.75	7.50	9.50	13.00	14.00	17.50	38.00	45.00	70.00	112.00	150.00	200.00
Diameter of Flanges ..... Inches	.....	.....	.....	.....	6	7	7½	8½	9	9¼	10	11	12½	13½	16	19	21	23½

IRON STRAINERS.

Size ..... Inches	1	1¼	1½	2	2½	3	3½	4	5	6	8
Strainers	$0.25	.33	.44	.55	.82	1.10	1.75	2.00	2.50	3.50	7.50
" Galvanized	.34	.43	.58	.80	1.20	1.70	2.60	3.00	3.90	6.00	11.00

HOOK PLATES.

Number of Hooks	1	2	3	4	5	6	7	8	9	10	11	12
For ¾-inch Pipe	.08	.16	.21	.24	.28	.34	.40	.45	.50	.56	.68	.72
For 1-inch Pipe	.09	.18	.23	.26	.32	.38	.46	.50	.65	.70	.85	1.00
For 1¼-inch Pipe	.10	.21	.27	.32	.41	.52	.68	.80	.90	1.20	1.35	1.40
For 1½-inch Pipe	.15	.28	.43	.58	.72	.88	1.10	1.25	1.40	1.55	1.65	1.90
For 2-inch Pipe	.22	.43	.65	.90	1.15	1.35	.....	.....	.....	.....	.....	.....

EXPANSION PLATES.

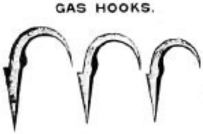
Number of Hooks	1	2	3	4	5	6	7	8	9	10	11	12
For ¾-inch Pipe.	.12	.23	.34	.45	.55	.65	.77	.90	1.05	1.25	1.45	1.65
For 1-inch Pipe.	.15	.25	.35	.50	.60	.70	.80	.95	1.10	1.35	1.55	1.70
For 1¼-inch Pipe	.17	.27	.40	.60	.70	.80	.90	1.15	1.30	1.50	1.70	2.00
For 1½-inch Pipe	.25	.40	.60	.75	.90	1.00	.....	.....	.....	.....	.....	.....

BEAM HOOKS.

LONG SHANK.

Size, Inches	½	¾	1	1¼	1½	2	2½	3
Each	.13	.15	.18	.22	.24	.35	.65	.90

GAS HOOKS.



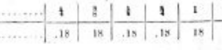
Size of Pipe, Inches	¼	⅜	½	¾	1	1¼	1½	2
Per 100	.30	.35	.40	.50	.65	.85	1.00	1.10

LAUNDRY COIL STANDS.

WITH MOVABLE HOOK PLATES.

Four Pipes High, Each	2.00
Six Pipes High, Each	2.75
Eight Pipes High, Each	3.50
Ten Pipes High, Each	4.25
Extra Hooks, Complete, Net, Each	.06

TINNED STRAPS.



Size of Pipes, Inches	¼	⅜	½	¾	1	1¼	1½
Per pound	.18	.18	.18	.18	.18	.18	.18

CEILING PLATES.

IN HALVES.

CEILING PLATES.

IN ONE PIECE.

CEILING PLATES IN HALVES.

Size, Inches	¾	1	1¼	1½	2	2½	3	3½	4
Each	.22	.28	.32	.40	.50	.65	.90	1.00	1.20

CEILING PLATES IN ONE PIECE.

Size, Inches	¾	1	1¼	1½	2	2½	3	3½	4
Each	.13	.16	.18	.23	.27	.36	.50	.55	.68

FLOOR PLATES.

Size, Inches	½	¾	1	1¼	1½	2	2½	3
Each	.06	.06	.08	.11	.14	.16	.24	.30

This Floor Plate is made with grooves on the under side of the flange, as shown in cut, in order that it may be easily parted by a slight blow when required to be used in halves.

PIPE RINGS.

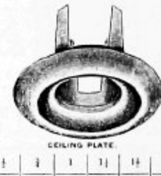
SOLID MALLEABLE PIPE RINGS.

Size	⅜	½	¾	1	1¼	1½	2
Plain Iron, Price per 100 Pieces	5.00	5.00	5.80	6.75	7.50	10.00	14.00
Galvanized Iron, Price per 100 Pieces	6.50	6.50	7.00	8.00	*9.00	12.00	16.00

BRASS FLOOR AND CEILING PLATES.

NICKEL PLATED.

FLOOR FLANGE



CEILING PLATE.

Size	½	¾	1	1¼	1½	2
Each	.09	.10	.11	.12	.13	.15

EXPANSION PIPE HANGERS,

OR RING HOOKS.

Size, Inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Complete, Each	.17	.18	.19	.25	.29	.36	.44	.55	.63	1.12	1.35
Size of Pipe, Rings and Buttons are tapped for, Inches	⅜	⅜	⅜	⅜	⅜	½	½	½	½	½	¾

PARTS OF EXPANSION PIPE HANGERS.

Size, Inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Plates, Each	.08	.08	.08	.09	.09	.10	.10	.10	.10	.10	.10
Buttons, Each	.06	.06	.06	.07	.07	.08	.08	.08	.08	.08	.08
Rings, Each	.08	.12	.15	.20	.25	.30	.40	.50	.60	1.00	1.25

MALLEABLE IRON FITTINGS.

RAILING FITTINGS.

No. 1.

No. 2.

No. 3.

No. 4.

No. 5.

No. 6.

No. 7.

No. 8.

In ordering these Fittings describe kind wanted by number and size.

PLEASE READ THIS NOTE WITH CARE.

To construct a railing *two* pipes high, the upper outlet of all Fittings used in lower pipes should be tapped with *left-hand thread*, but when orders are sent us without specifying how outlets are to be tapped, *all Fittings will invariably be furnished right-hand.*

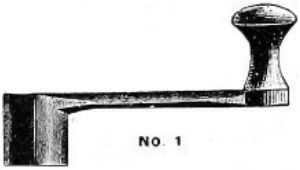
As the Fittings do not need to be steam or water tight, a sufficiently clean thread to screw up well and make a good job can be made by running a *left-hand tap* into any outlet tapped *right-hand.*

Size		½	¾	1	1¼	1½	2
No. 1	Elbow	.15	18	.20	.35	.45	.72
" 2	Elbow, Side Outlet	.20	.23	.25	.40	.50	.80
" 3	Tee	.20	.23	.25	.40	.50	.75
" 4	Tee, Side Outlet	.30	.33	.35	.45	.55	.90
" 5	Cross	.30	.33	.35	.45	.58	1.00
" 6	Cross, Side Outlet	.35	.38	.40	.50	.65	1.35
" 7	Floor Flange	.14	.15	.15	.20	.28	.30
" 8	Acorn Ornament	.16	.18	.20	.25	.35	.90

Right and Left, and Left Hand, 15 per cent extra.

MALLEABLE IRON FITTINGS.

HYDRANT HANDLES.



NO. 1

Per Pound..... .15

With ⅜ inch Pipe Thread,

NO. 2.

Per Pound..... .20

HYDRANT ROD SOCKETS.

Per Pound..... .15

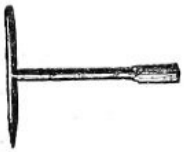
WOOD ROD COUPLINGS

Per Set, Plain..... .40
Per Set, Galvanized..... .50

HYDRANT CLAMPS.

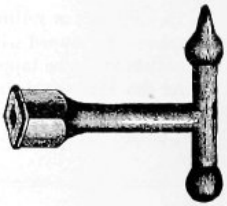
Size, Inches	½	⅝	¾	1
With Square Hole, per Pound	.15	.15	.15	.15
Tapped for ¾ Inch Pipe, per Pound	.18	.18	.18	.18
Tapped for 1 Inch Pipe, per Pound	.20	.20	.20	.20
Brass, Each	.20	.20	.25	.30

STREET WASHER KEYS.



Either Malleable Iron or Cast Iron Japanned, with ⅜ and ½ inch square rod.

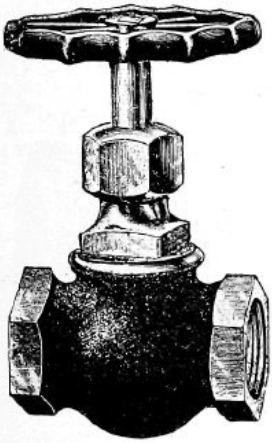
Per Pound..... .15



PUMP ROD SOCKETS.

Size, Inches	⅜	⅜ x 7/16	7/16	½
Number of Threads to Inch	14	14–12	12	12
Per Pound	.25	.25	.25	.25
Per Pound, Galvanized	.32	.32	.32	.32

GLOBE AND ANGLE VALVES.



STEAM METAL.

Size .....In.	⅛	¼	⅜	½	¾	1	1¼
Screwed.....Each.	$0 72	72	77	1 00	1 26	1 80	2 52
Size .....In.	1½	2	2½	3	3½	4	
Screwed.....Each.	$3 50	5 30	10 00	14 40	26 50	36 00	

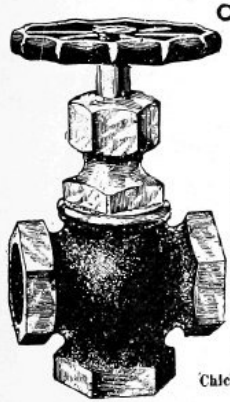
With Jenkins Discs.

Size.....In.	¼	⅜	½	¾	1
Each $1 10		1 25	1 60	2 20	2 80
Size.....In.	1¼	1½	2	2½	3
Each 4 00		5 50	8 00	15 75	22 00

Extra Discs.

Size.....In.	¼	⅜	½	¾	1	1¼
Each $0 03		04	04	05	06	09
Size.....In.	1½	2	2½	3	3½	4
Each	12	18	24	33	45	52
Size.....In.	5	6	7	8	10	12
Each	68	90	98	1 05	1 50	2 00

CROSS VALVES

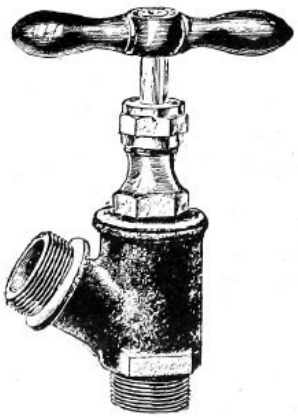


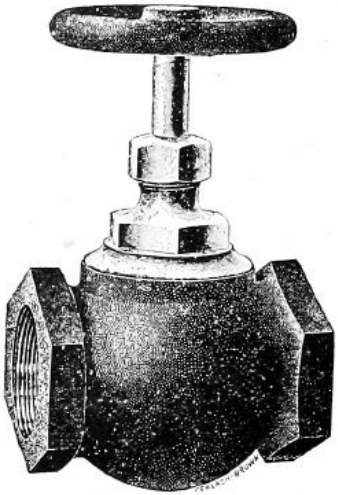
	STEAM METAL.	With Jenkins Discs.
¼ inch...Each	$1 25	.....
⅜ " ... "	1 25	.....
½ " ... "	1 50	$2 25
¾ " ... "	2 00	2 50
1 " ... "	2 50	3 25
1¼ " ... "	3 50	4 75
1½ " ... "	5 00	6 25
2 " ... "	8 00	9 50
2½ " ... "	16 00	.....
3 " ... "	24 00	.....

HOSE VALVES.

Chicago Pattern, with Leather Discs.

1 inch...Each	$3 15
1¼ " ... "	3 70
1½ " ... "	4 75
2 " ... "	7 00
2½ " ... "	8 50





IRON BODY GLOBE VALVES.

Brass Mounted, Plain.

SCREWED.

Size.....In.	1	1¼	1½	2	2½	3
Each.....	$2 25	2 75	3 50	5 40	7 35	9 80

FLANGED.

Size.....In.	1	1¼	1½	2	2½	3
Each.....	$3 25	3 85	4 80	7 00	9 00	12 50

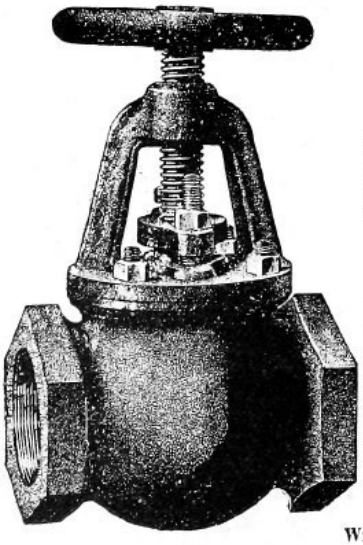
With Jenkins Discs.

SCREWED.

Size .....Inches	2	2½	3
Each .....$	7 25	11 00	16 00

FLANGED.

Size .....Inches	2	2½	3
Diameter of Flanges...Inches	6½	7	8
Each .....$	8 50	13 00	18 00



IRON BODY GLOBE VALVES.

Brass Mounted, with Yoke.

SCREWED.

Size...In.	2	2½	3	3½	4	4½
Each.....	$7 00	9 00	12 50	15 25	19 00	24 00
Size...In.	5	6	7	8	10	12
Each.....	27 00	37 50	63 00	72 00	114 00	170 00

FLANGED.

Size ....In.	2	2½	3	3½
Each	$8 60	10 75	15 00	18 50
Diam. of Flanges..In.	6½	7	8	8½
Size .....In.	4	4½	5	6
Each	22 50	27 50	31 00	42 00
Diam of Flanges..In.	9	9½	10	11
Size .....In.	7	8	10	12
Each	68 00	77 00	123 00	187 00
Diam. of Flanges..In.	13	14	16	19

With Jenkins Discs.

SCREWED.

Size... ..In.	2½	3	3½	4	5	6	7	8	10	12
Each.....$	12 00	16 75	19 50	24 00	40 00	48 00	80 00	90 00	130 00	185 00

FLANGED.

Size... .....Inches	2½	3	3½	4	5	6	7	8	10	12
Each.....$	14 00	18 50	21 50	26 00	42 00	50 00	80 00	90 00	130 00	185 00
Diam. of Flanges..In.	7	8	8½	9	10	11	13	14	16	19

IRON BODY ANGLE VALVES.

Brass Mounted, Plain.

SCREWED.

Size.....Inches	1	1¼	1½	2	2½	3
Each	$2 25	2 75	3 50	5 40	7 35	9 80

FLANGED.

Size ....Inches	2	2½	3
Price.....Each	$7 00	9 00	12 50
Diam. of Flanges.....Inches	6⅛	7	8

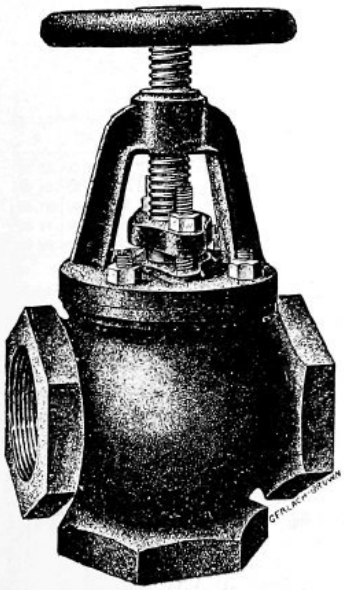
With Jenkins Discs.

SCREWED.

Size .....Inches	2	2½	3
Price .....Each	$7 25	11 00	16 00
Distance from end to end, in.	6	7⅛	8¼

FLANGED.

Size .....Inches	2	2½	3
Price .....Each	$8 50	13 00	18 00
Diam. of Flanges...Inches	6¼	7	8



CROSS VALVES.

Iron Body. Brass Mounted.

SCREWED.

Size .....Inches	2	2½	3
Price.....Each	$6 50	9 00	12 50
Distance from end to end, in.	5¾	6⅝	7½

FLANGED.

Size .....Inches	2	2½	3
Price..... Each	$9 00	11 75	16 50
Diam. of Flanges.....Inches	6½	7	8
Length face to face of Flanges.....Inches	5¾	7¼	8¼

Iron Body, with Yoke.

SCREWED.

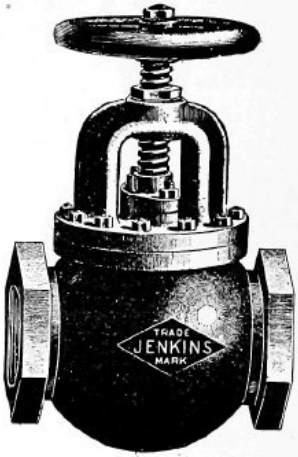
Size ....Inches	2	2½	3	3½
Price.....Each	$8 50	11 75	16 25	20 00
Size .....Inches	4	4½	5	6
Price.....Each	23 50	30 65	35 25	47 25
Size .....Inches	7	8	10	12
Price.....Each	78 00	92 00	162 00	240 00

FLANGED.

Size .....Inches	2	2½	3	3½
Price.....Each	$11 00	14 50	20 00	25 00
Size .....Inches	4	4½	5	6
Price.....Each	28 50	36 00	41 00	54 00
Size .....Inches	7	8	10	12
Price.....Each	85 00	100 00	175 00	265 00

JENKINS' GENUINE VALVES.

BRASS SCREWED.



WITH YOKE SCREWED.

JENKINS BROS. GLOBE, ANGLE, AND CROSS VALVES..

Size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Brass Globe and Angle Valves, screwed	1 10	1 10	1 25	1 60	2 20	2 80	4 00	5 50	8 75	15 75	22 00
" " " flanged						6 00	9 00	11 00	16 50	25 00	34 00
Brass Cross Valves, screwed		1 70	2 00	2 25	2 50	3 25	4 75	6 25	9 50	20 00	27 50
" " flanged						8 64	11 45	15 10	22 70	33 82	44 30
Brass Hose End Globe and Angle Valves						3 30	4 70	6 50	9 15	17 10	23 35

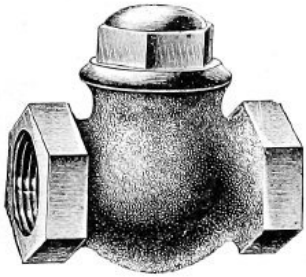
IRON BODY, COMPOSITION MOUNTED.

Size	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12
GLOBE AND ANGLE VALVES:																
Brass Hub, screwed	2 75	2 85	3 85	5 00	7 25	11 00	16 00									
" flanged					8 50	13 00	18 00									
With Yoke, screwed					10 00	12 00	16 75	19 50	24 00	32 00	40 00	48 00	80 00	90 00	130 00	185 00
" flanged					11 75	14 00	18 50	21 50	26 00	34 00	42 00	50 00	80 00	90 00	130 00	185 00
Cross Valves, screwed						16 00	21 00	26 00	30 00	42 00	45 00	58 00				
" flanged						19 00	24 00	29 00	33 00	45 00	48 00	62 00				

Size	14	16	18	20	24
Globe and Angle Valves, with Yoke, flanged	334 00	400 00	511 00	578 00	1223 00

HORIZONTAL CHECK VALVES.

STEAM METAL.



Size, In.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Each	.65	.65	.70	.90	1.15	1.60	2.25	3.15	4.75	9.00	13.00

IRON BODY HORIZONTAL CHECK VALVES.

BRASS MOUNTED.

SCREWED.

Size, Inches	1	1¼	1½	2	2½	3	3½	4
Each	1.50	2.20	2.65	3.60	6.50	8.90	12.25	14.25
Size, Inches	4½	5	6	7	8	10	12	.....
Each	19.00	22.00	30.00	45.00	57.00	105.00	155.00	.....

FLANGED

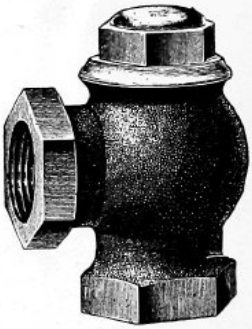
Size, Inches	1	1¼	1½	2	2½	3	3½	4
Diameter of Flanges, Inches	4	4½	5	6	7	7½	8½	9
Each	2.50	3.25	4.00	5.25	8.25	11.50	15.50	18.00
Size, Inches	4½	5	6	7	8	10	12	*14
Diameter of Flanges, Inches	9¼	10	11	12½	13½	16	19	21
Each	22.50	26.00	35.00	50.00	62.00	115.00	175.00	300.00

VERTICAL CHECK VALVES.

STEAM METAL.

ANGLE CHECK VALVES.

STEAM METAL.



Size, Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Each	.72	.72	.77	1.00	1.26	1.80	2.52	3.50	5.30	10.00	14.40

IRON BODY ANGLE CHECK VALVES.

BRASS MOUNTED.

SCREWED.

Size, Inches	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Each	2.20	2.65	3.60	6.50	8.90	12.25	14.25	19.00	22.00	30.00	45.00	57.00

FLANGED.

Size, Inches	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Each	3.25	4.00	5.25	8.25	11.50	15.50	18.00	22.50	26.00	35.00	50.00	62.00
Diam. of Flanges	4½	5	6	7	7½	8½	9	9¼	10	11	12½	13½

IRON BODY VERTICAL CHECK VALVES.

BRASS MOUNTED.

SCREWED.

Size, Inches	2½	3	3½	4	4½	5	6	7	8
Each	9.50	12.50	17.00	21.00	30.00	33.00	40.00	62.00	73.00

FLANGED

Size, Inches	2½	3	3½	4	4½	5	6	7	8
Each	11.50	15.00	20.00	25.00	33.50	37.00	45.00	67.00	78.00
Diameter of Flanges	7	7½	8½	9	9¼	10	11	12½	13½

JENKINS BROS. BRASS CHECK VALVES.

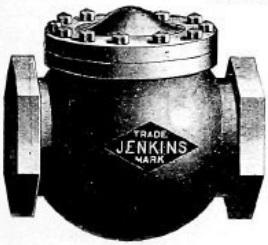
HORIZONTAL.

ANGLE.

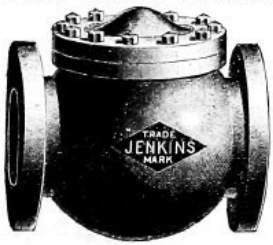
VERTICAL.

Size	¼"	⅜	½	¾	1	1¼	1½	2	2½	3
Brass, Horizontal, Angle, and Vertical, screwed	1 10	1 20	1 30	1 90	2 60	3 60	5 00	7 50	13 50	20 50
" " " flanged	....	....	....	4 75	5 50	7 80	9 80	15 00	22 80	32 40

JENKINS BROS. IRON BODY CHECK VALVES.



HORIZONTAL, SCREWED.



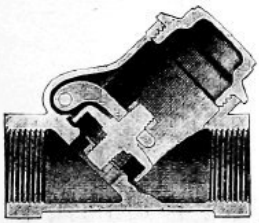
HORIZONTAL, FLANGED.

ANGLE, FLANGED.

Size	2½	3	3½	4	5	6
Iron Body Check, screwed, horizontal, angle, and vertical	10 50	14 00	17 00	20 00	30 00	40 00
" " " " flanged, " " "	12 50	16 50	20 00	23 00	33 00	43 00

JENKINS BROS. SELF-ADJUSTING SWING CHECK VALVE.

SIMPLEST, MOST DURABLE AND ECONOMICAL SWING CHECK VALVE IN THE MARKET.



Simplicity.—It can be repaired by simply removing cap and renewing the disc.

Durability.—As **it is not** metal against metal, there is no chance for the seat to wear,—the only wear being on the Jenkins Disc.

Economy.—It has been demonstrated that the average life of a Jenkins Disc in use in Check Valves is from eight to ten years; consequently, the saving in disconnecting and regrinding the valves alone makes it the most economical.

EVERY VALVE WARRANTED AS REPRESENTED.

Size	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10
Brass, screwed	1 20	1 30	1 90	2 60	3 60	5 00	7 50	13 50	20 50	....	....	....	....	....	....
" flanged	....	....	....	5 50	7 80	9 80	15 00	22 80	32 40	....	....	....	....	....	....
Iron Body, screwed	——	....	——	....	....	....	....	12 00	15 50	18 50	22 75	32 90	43 75	92 00	146 00
" " flanged	....	....	....	....	....	....	....	13 90	17 75	20 60	25 45	36 10	47 10	92 00	146 00

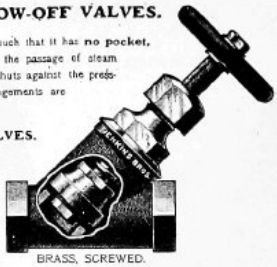
JENKINS BROS. Y OR BLOW-OFF VALVES.

IRON, FLANGED.

The construction is such that it has **no pocket**, or anything to obstruct the passage of steam or fluid. In closing it shuts against the pressure. Its internal arrangements are similar to those used in

JENKINS BROS. VALVES.

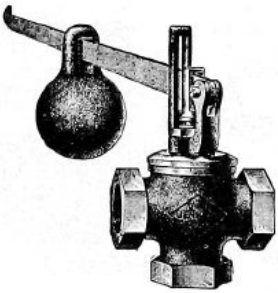
It has no superior as a **blow-off valve**, and is especially adapted for use in **Paper Mills, Sugar Houses,** or any place where the *passage of a thick fluid* is required.



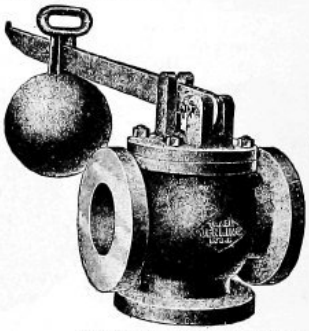
BRASS, SCREWED.

Size	⅜	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8
Brass, screwed	2 00	3 00	4 00	5 00	6 50	9 25	18 00	25 00	.....	.....	.....	.....	.....
" flanged	.....	.....	6 64	10 78	12 96	19 41	28 05	36 68	.....	.....	.....	.....	.....
Iron Body, screwed	.....	.....	.....	.....	.....	10 40	14 80	20 00	28 00	35 00	58 80	70 00	115 00
" flanged	.....	.....	.....	.....	.....	12 40	17 40	23 00	31 00	38 40	64 00	70 00	115 00
Iron Body Y Valves, flanged.	Diameter of flanges					6	7	7½	8½	9	10	11	13½
	Face to face of flanges					8½	11	12½	15	14	16½	18¾	23½

JENKINS BROS. SAFETY VALVES.



BRASS SAFETY VALVE, SCREWED.

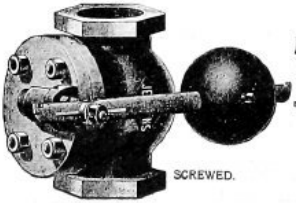


IRON BODY SAFETY VALVE, FLANGED.

....PRICE LIST....

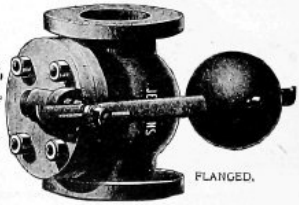
Size	⅜	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Brass, screwed	4 12	4 95	5 50	8 25	10 15	15 40	.....	.....	.....	.....	.....	.....	.....
Iron Body, screwed	.....	4 25	4 50	6 25	7 25	10 25	16 75	22 00	31 00	38 00	46 50	55 00	73 00
" flanged	.....	.....	.....	.....	.....	12 25	19 00	25 50	34 00	41 50	51 75	62 00	80 00

JENKINS BROS. BACK-PRESSURE VALVES.



SCREWED.

..ARE..
Absolutely Noiseless,
FROM THE FACT OF THEIR BEING FITTED WITH JENKINS DISCS INSTEAD OF USING METAL SEATS.



FLANGED.

IRON BODY, COMPOSITION MOUNTED.

Size	2	2½	3	3½	4	4½	5	6	8
Screwed	7 68	8 88	11 05	13 45	15 85	18 00	23 75	32 15	58 00
Flanged	8 88	10 10	12 25	15 35	18 15	22 00	26 15	34 80	58 00

LUNKENHEIMER'S REGRINDING VALVES.

Size, Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Globe Valves, brass, each	$0 70	$0 70	$0 85	$1 15	$1 45	$2 00	$2 80	$3 90	$6 20	$12 00	$16 50
Angle Valves, brass, each	70	70	85	1 15	1 45	2 00	2 80	3 90	6 20	12 00	16 50
Cross Valves, brass, each	1 00	1 00	1 00	1 50	2 00	2 70	3 50	5 10	8 00	16 00	24 00
Globe or Angle Valves, finished all over with finished Brass Wheel, brass, each	1 75	1 90	2 15	2 50	3 10	3 65	5 25	7 25	10 75	22 00	33 50
Cross Valves, finished all over with finished Brass Wheel, brass, each	2 40	2 60	2 90	3 30	4 20	4 90	7 00	9 70	14 30	29 30	44 70

LUNKENHEIMER'S MEDIUM PATTERN DOUBLE DISC GATE VALVES.

SCREW ENDS.

Size, Inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Brass, Screw Ends, each	$1 10	$1 10	$1 30	$1 90	$2 50	$3 50	$5 00	$ 7 50	$14 00	$20 00
Finished Brass, with Wood Wheels, each	.....	.....	2 60	3 30	4 50	6 00	7 50	12 00	.....	.....

"HANDY" GATE VALVE.

FOR PRESSURES NOT TO EXCEED 75 POUNDS. SCREW ENDS ONLY, NOT MADE WITH FLANGE ENDS.

Size, In.	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	8
Br. Body each	$1 60	$1 80	$2 50	$3 50	$5 00	$7 50	$13 50	$19 00	$40 00	$60 00	.....	.....	.....	.....
Ir. Body Brass Mount., each	.....	.....	.....	.....	.....	7 00	12 00	15 00	18 00	21 00	$25 00	$30 00	$35 00	$65 00
All Iron, each	.....	3 40	4 00	4 50	6 00	7 00	12 00	15 00	18 00	21 00	25 00	30 00	35 00	65 00

LEVER THROTTLE VALVE.

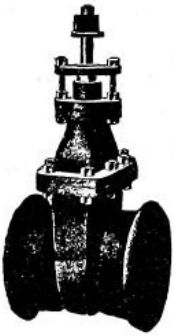
FOR 175 POUNDS WORKING PRESSURE. SCREW ENDS ONLY, NOT MADE WITH FLANGE ENDS.

Size, Inches	¾	1	1¼	1½	2	2½
Brass Body, each	$ 3 00	$ 4 00	$ 5 00	$ 7 00	$10 00	$19 00
Size, Inches	2½	3	3½	4	5	6
Iron Body, Brass Mounted, each	$16 00	$20 00	$25 00	$30 00	$35 00	$40 00

STRAIGHTWAY VALVES.

WEDGE DISC.

IRON BODY WATER GATES, BRASS TRIMMINGS.



SIZE ..... Inches	2	3	4	5
Price ..... Each	$10.00	15.00	20.00	25.00
End to End of Pipe when laid in bell .... Inches	3¼	3½	4¼	4½
Inside diameter Bell Socket ..... "	3⅛	4⅜	5¾	6⅞

SIZE ..... Inches	6	7	8	10
Price ..... Each	$30.00	45.00	55.00	90.00
End to End of Pipe when laid in bell .. Inches	4¾	5	5	5¾
Inside diameter Bell Socket ..... "	7⅞	8⅞	10	12

SIZE ..... Inches	12	14	16	18
Price ..... Each	$125.00	190.00	275.00	375.00
End to End of Pipe when laid in bell .. Inches	6½	6¾	8	9
Inside diameter Bell Socket ..... "	14¼	16¼	18½	20⅛

SIZE ..... Inches	20	22	24	30
Price ..... Each	425.00	525.00	600.00	1200.00
End to End of Pipe when laid in bell ..... Inches	9	9½	10	21
Inside diameter Bell Socket ..... "	22¾	24¾	26¾	35

These Valves have stationary Stems and open to the Left.

STRAIGHTWAY VALVES.

FOR GAS, ACIDS, ETC.

SCREWED.

SIZE ..... Inches	2	2½	3	3½	4	4½	5
Price ..... Each	$10.00	12.00	15.00	18.00	20.00	23.00	25.00

SIZE ..... Inches	6	7	8	9	10	12
Price ..... Each	$30.00	45.00	55.00	80.00	90.00	125.00

FLANGED.

SIZE ..... Inches	2	2½	3	3½	4	4½	5	6
Price ..... Each	10.00	12.00	15.00	18.00	20.00	23.00	25.00	30.00

SIZE ..... Inches	7	8	9	10	12	14	16
Price ..... Each	45.00	55.00	80.00	90.00	125.00	190.00	275.00

HUB ENDS.

SIZE ..... Inches	3	4	6	8	10	12	14	16
Price ..... Each	$15.00	20.00	30.00	55.00	90.00	125.00	190.00	275.00

ASBESTOS DISC BRASS VALVES.

Size .... Inches	1/8	1/4	3/8	1/2	3/4	1	1¼	1½	2	2½	3
Brass Globe & Angle Valves Screwed	$1.10	1.10	1.25	1.60	2.20	2.80	4.00	5.50	8.75	15.75	22.00
Brass Globe & Angle Valves Flanged	......	......	......	......	......	6.00	9.00	11.00	16.50	25.00	34.00
Brass Cross Valve Screwed	......	......	......	2.25	2.50	3.25	4.75	6.25	9.50	20.00	30.00
Brass Cross Valve Flanged	......	......	......	......	......	8.75	11.50	16.25	23.00	32.00	47.00

ASBESTOS DISC, IRON BODY VALVES.

GLOBE

ANGLE

CROSS

Size .... Inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Globe and Angle Valves, Brass Hub, screwed ... Each	$7.25	11.00	16.00	18.50	23.00	......	......		......	......	......	......
" " " " " " flanged ... "	8.50	13.00	18.00	20.50	25.00	......	......	......	......	......	......	......
" " " " with Yoke, screwed ... "	10.00	12.00	16.75	19.50	24.00	32.00	40.00	48.00	80.00	90.00	130.00	185.00
" " " " " " flanged ... "	11.75	14.00	18.50	21.50	26.00	34.00	42.00	50.00	80.00	90.00	130.00	185.00
Cross Valves, Brass Hub, screwed .... "	14.00	16.00	21.00	23.00	27.00	......	......	......	......	......	......	......
" " " " flanged .... "	17.00	19.00	24.00	27.00	30.00	......	......	......	......	......	......	......
" " with Yoke, screwed .... "	14.00	16.00	21.00	26.00	30.00	42.00	45.00	58.00	......	......	......	......
" " " " flanged .... "	17.00	19.00	24.0·	29.00	33.00	45.00	48.00	62.00	......	......	......	......
Extra Discs .... "	.38	.48	.60	.75	.90	1.10	1.25	1.60	2.40	2.90	4.75	5.50

VULCANIZED ASBESTOS PACKED IRON COCKS.

Size .... Inches	1/8	1/4	3/8	1/2	3/4
Price, Screwed or Flanged	$1.30	1.30	1.45	1.60	2.10
Size .... Inches	1	1¼	1½	2	2½
Price, Screwed or Flanged	$2.50	3.50	4.75	7.00	......
Size .... Inches	3	3½	4	5	6
Price, Screwed or Flanged	...	......	...	......	....

SWING JOINTS.

STEAM METAL

Size .... Inches	3/8	1/2	3/4	1	1¼	1½	2
Price .... Each	$1.25	1.75	2.40	3.50	4.50	6.25	9.00

LUNKENHEIMER'S IMPROVED
REGRINDING CHECK VALVES.

HORIZONTAL.

ANGLE.

Size.....Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Check Valves, Horizontal, Angle and Vertical.....Each	$0.50	.50	.60	.85	1.15	1.55	2.30	3.25	5.20	10.00	14.00
" " " Enlarged seats..... "	.....	.....	.....	1.15	1.55	2.30	3.25	5.20	10.00		
" " with Drain Cocks..... "	.....	.....	1.05	1.30	1.60	2.00	2.75	3.70	5.65	10.50	14.50
" " Enlarged Seats, with Drain Cocks..... "	.....	.....	.....	1.60	2.00	2.75	3.70	5.65	10.50	-	

"CLIP" GATE VALVE.

DOUBLE SEATED.

IRON BODY, BRASS MOUNTED.—FOR 100 LBS. WORKING PRESSURE.

Size.....Inches	½	¾	1	1¼	1½	2	2½	3
Iron Body, Brass Mounted, Screw Ends.....Each	$1.50	$1.90	$2.50	$3.50	$5.00	$7.50	$12.00	$15.00
All Iron, Screw Ends..... "	1.50	1.90	2.50	3.50	5.00	7.50	12.00	15.00
Dist. End to End, Screw End..Inches	2	2¼	2⅜	2⅞	3	3½	4⅛	4⅞

BRASS STRAIGHTWAY VALVES.

DOUBLE GATE, RISING STEM.

Size.....Inches	¼	⅜	½	¾	1	1¼	1½
Screwed.....Price each	$1.25	1.25	1.30	1.75	2.50	3.50	5.00

Size.....Inches	2	2½	3	*3½	*4	*5	*6
Screwed.....Price each	$7.50	14.00	20.00	32.00	50.00	70.00	120.00
Flanged.....Price each	14.00	21.00	34.00	45.00	60.00	85.00	135.00

*The 3½ to 6 inch values have flanged bonnet, non-rising stems, and are made to order only and at a special discount.

GLOBE SAFETY VALVES.

IRON BODY, BRASS MOUNTED.

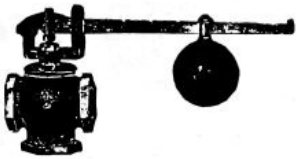


FIG. 364.

FIG. 365.

FIG. 364.

Size .....Inches	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Price .....Each.	3.50	4.00	5.00	5.80	7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75	93.50	132.00

FIG. 365.

Size ..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Price.....Each.		5.50	6.75	7.75	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00	100.00	140.00
Dia. of Flanges...					6	7	7½	8½	9	9¼	10	11	12½	13½

ANGLE SAFETY VALVES.

IRON BODY, BRASS MOUNTED.

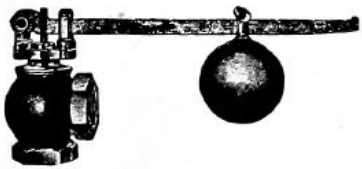


FIG. 366.

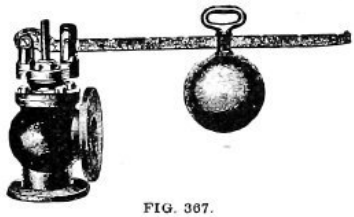


FIG. 367.

FIG. 366.

Size..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Price..... Each.	3.50	4.00	5.00	5.80	7.80	13.25	17.25	23.00	28.75	34.50	41.50	57.75	93.50	132.00

FIG. 367.

Size..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Price ..... Each.	.....	5.50	6.75	7.75	10.25	16.00	21.50	27.50	34.00	40.00	48.00	65.00	100.00	140.00
Dia. of Flanges ..	.....	.....	.....	.....	6	7	7½	8½	9	9¼	10 .	11	12½	13½

LOW PRESSURE SAFETY VALVES.

FOR OIL STILLS.— IRON BODY, BRASS MOUNTED.

SCREWED OR FLANGED

Size .....Inches	4	6	8	10
Price, Screwed or Flanged.....Each.	25.00	44.00	280.00	125.00
Diameter of Flanges.....Inches	9	11	13½	16

SCREWED.

IRON COCKS.

FLANGED.

ALL IRON.

SIZE ..... Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed	.85	.90	1.05	1.30	1.60	1.95	2.70	4.40	6.75	12.00	15.50	32.00	45.00
Flanged				2.25	2.75	3.25	4.25	6.25	9.50	15.00	19.00	36.00	50.00

WITH BRASS WASHER.

SIZE ..... Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed		1.00	1.20	1.55	1.95	2.35	3.20	5.15	7.75	14.00	19.00	38.00	53.00
Flanged				2.50	3.10	3.65	4.75	7.00	10.50	17.00	22.50	42.00	58.00

WITH BRASS PLUG.

SIZE ..... Inches	¾	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed	1.25	1.30	1.60	1.90	2.65	3.75	5.25	8.75	13.00	27.50	36.50	67.00	94.00
Flanged				3.00	3.75	5.00	7.00	10.50	15.75	30.00	40.00	70.00	100.00

WITH BRASS PLUG AND WASHER.

SIZE ..... Inches	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed		1.40	1.75	2.15	3.00	4.15	5.75	9.50	14.00	29.50	40.00	73.00	102.00
Flanged				3.25	4.10	5.40	7.50	11.25	16.75	32.00	43.50	76.00	108.00

SCREWED.

3 WAY IRON COCKS.

FLANGED.

ALL IRON.

SIZE ..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed	1.65	1.80	2.05	2.65	3.65	5.35	7.50	14.00	19.00	36.50	52.00
Flanged		3.75	4.25	5.25	7.00	9.00	12.75	20.00	26.00	44.00	60.00

WITH BRASS WASHER.

SIZE ..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed	1.80	2.05	2.40	3.05	4.15	6.10	8.50	16.00	22.50	42.50	60.00
Flanged		4.00	4.60	5.65	7.50	9.75	13.75	22.00	29.50	50.00	68.00

WITH BRASS PLUG.

SIZE ..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed	2.20	2.40	3.10	4.50	6.25	9.75	13.75	30.00	40.00	71.50	100.00
Flanged		4.50	5.25	7.00	9.50	13.25	19.00	36.00	47.00	80.00	108.00

WITH BRASS PLUG AND WASHER.

SIZE ..... Inches	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Screwed	2.35	2.65	3.45	4.90	6.75	10.50	14.75	32.00	43.50	77.50	108.00
Flanged		4.75	5.60	7.40	10.00	14.00	20.00	38.00	50.50	86.00	116.00

BRASS STEAM COCKS.

SQUARE HEAD.

FLAT HEAD.

TEE HANDLE.

SIZES.....Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Square Head.....Each. Flat " ..... " Tee Handle..... "	$0.85	.85	1.00	1.25	1.70	2.35	3.70	4.85	7.30	14.50	22.50	38.50	50.0

SQUARE OR FLAT HEAD.

CHECK ON KEY.

MALE AND FEMALE.

FLANGED.

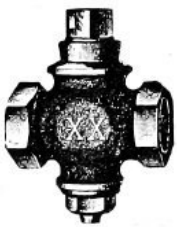
SIZE .....Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6
Check on Key..... Each.	.....	1.00	1.15	1.40	1.90	2.55	3.95	5.15	7.65	15.00	23.25	.....	.....	.....	.....
Male and Female..... "	.....	1.35	1.45	2.00	2.50	3.00	5.35	6.75	9.85	.....	.....	.....	.....	.....	.....
Flanged ..... "	.....	.....	.....	.....	.....	7.30	9.70	11.75	18.00	27.50	43.00	62.00	84.00	150.00	275.00

THREE-WAY BRASS STEAM COCKS.

SQUARE HEAD

SIZE.....Inches	½	¾	1	1¼	1½	2	2½	3	3½	4
Screwed..... Each.	82.50	3.00	3.75	5.75	7.15	11.00	18.75	26.00	50.00	70.00
Flanged..... "	7.75	8.75	11.25	14.75	17.75	27.00	38.25	57.00	85.00	121.00

EXTRA HEAVY BRASS STEAM COCKS.



SIZE.....Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Screwed..... Each	81.30	1.30	1.50	2.00	2.85	4.00	6.75	8.50	13.50	25.00	37.00	.....	.....
Flanged..... "	.....	.....	.....	6.50	7.75	10.00	14.25	17.25	27.00	41.00	.....	84.00	120.00

BRASS SERVICE COCKS.

SQUARE HEAD.

FLAT HEAD.

TEE HANDLE.

SIZE ..... Inches.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Square Head ..... Each.	$0.75	.75	.85	.95	1.15	1.50	2.25	3.10	5.00	11.00	16.00
Flat " "											
Tee Handle " "											

WITH CHECK ON KEY.

MALE AND FEMALE.

SIZE ..... Inches.	⅛	¼	⅜	½	¾	1	1¼	1½	2
Service Cock with Check ..... Each.	$0.90	.90	1.00	1.10	1.35	1.70	2.50	.....	.....
Male and Female ..... "	.....	1.00	1.00	1.30	1.40	1.95	3.00	4.25	6.00

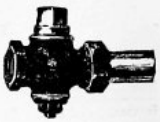
LOCK.

EXTRA HEAVY.

SIZE ..... Inches.	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Lock Gas Service Cocks ..... Each,	.....	.....	1.30	1.60	2.10	3.50	5.00	7.00	.....	.....
Extra Heavy " " ..... "	$0.85	.95	1.05	1.30	1.70	2.60	3.60	6.50	12.00	18.00

METER COCK.

UNION METER COCK.



BRASS METER COCKS.

SIZE ..... Inches.	½	¾	1	1¼	1½	2
Meter Cocks ..... Each,	$1.30	1.40	1.95	3.00	4.25	6.00
Union Meter Cocks "	1.40	1.55	2.20	3.40	5.00	7.00

Lunkenheimer

Top Outlet.

Improved Pop Safety Valves.

For Stationary, Portable and Marine Steam Boilers.

BRASS.

PRICE LIST.

Size Pipe, ... inches	⅜	½	¾	1	1¼	1½	2	2½	3
Brass, Top Outlet . . . each	5 50	6 00	6 50	7 50	9 00	11 50	18 00	28 00	38 00
Brass, Angle Outlet, . . each	6 00	6 50	7 00	8 00	9 80	12 40	19 50	30 00	41 00

Angle Outlet.

Plain Pattern

POP SAFETY VALVES.

Iron Body Brass Mounted.

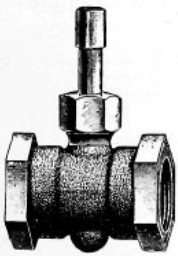
Screw Ends.

PRICE LIST.

Size, ... inches	2	2½	3	3½	4	4½	5	6
Screw Ends, ... each	22 00	32 00	40 00	56 00	72 00	84 00	100 00	120 00
Flange Ends, . . each	22 00	32 00	40 00	56 00	72 00	84 00	100 00	120 00
Suitable for Boilers, . H. P.	50	70	100	125	150	175	200	300
Diameter of Flanges, inches	6	7	7½	8½	9	9½	10	11

Flange Ends.

Butterfly Valves.



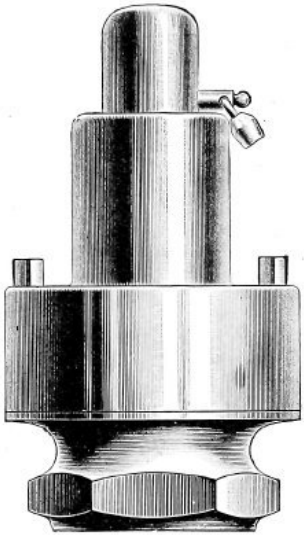
Brass.

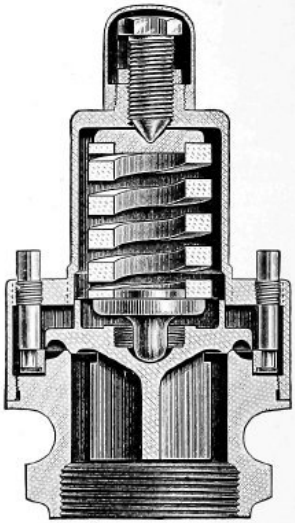
PRICE LIST.

Size . inches	1	1¼	1½	2	2½	3
Brass, Screw Ends . each	4 40	5 65	6 75	10 00	13 75	21 00
Iron Body, Screw Ends each	.....	.....	7 00	8 00	9 50	12 00

LOCOMOTIVE OPEN POP SAFETY VALVE.

PATENTED.





The above cuts represent our Open Locomotive Pop Safety Valve. This valve has means of adjustment from the outside. The blowing-off pressure is adjusted by the compression screw underneath the cap. The blow-down is adjusted by means of two square head relief nuts projecting through the valve casing, one on either side. These valves are made extra heavy and of the best steam metal to stand the high pressures carried on the new locomotives.

PRICES AND DIMENSIONS.

Size.	Height.	Diameter.	Price.
2¼ inches	10 inch	5 inch	$45 00
2½ "	10 "	5¼ "	50 00
3 "	10½ "	5¾ "	65 00
3½ "	12¼ "	6½ "	90 00
4 "	13½ "	7¼ "	135 00

STEAM BIBBS.

LEVER HANDLE

WITH UNION.

Size ..... Inches	¼	⅜	½	¾	1	1¼	1½	2
Rough ..... Each	$1.00	1.25	1.70	2.50	3.50	5.00	8.00	15.00
Finished ..... "	1.25	1.50	2.00	3.00	4.50	6.00	10.00	18.00
With Union, Rough ..... "	1.25	1.50	2.00	3.00	4.50	6.00	10.00	18.00
" " Finished ..... "	1.50	1.75	2.50	3.50	5.50	7.00	12.00	20.00

CYLINDER COCKS.

LEVER HANDLE.

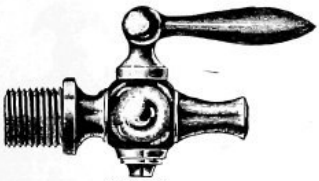


FIG. 290.

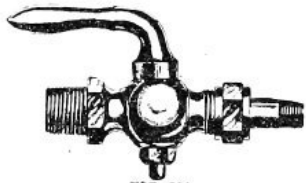
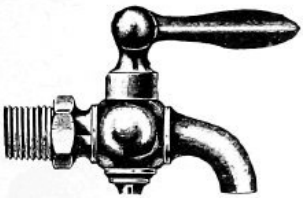


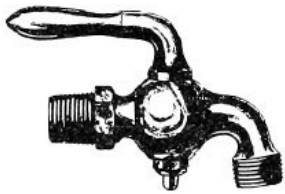
FIG. 291.

Size ..... Inches	¼	⅜	½	¾
Fig. 290. Price Cylinder Cock ..... Each	$1.00	1.15	1.65	2.40
" 291. " " " with Union ..... "	1.75	2.00	2.50	3.75

WITH BIBB



WITH BIBB SCREW ON NOSE.



Size ..... Inches	¼	⅜	½	¾
T Handle with Bibb ..... Each	$1.00	1.15	1.60	2.35
Lever Handle with Bibb ..... "	1.15	1.30	1.85	2.60
T Handle with Bibb Screw on Nose ..... "	1.10	1.35	1.85	2.45
Lever Handle with Bibb Screw on Nose ..... "	1.25	1.50	2.10	2.70

WITH BIBB, KEY ON SIDE.

Size ..... Inches	¼	⅜	½
T Handle ..... Each	$0.90	1.00	1.30
Lever Handle ..... "	1.05	1.15	1.55

AIR COCKS.

T HANDLE

SINGLE THREAD.

DOUBLE THREAD

Size..... Inches	⅛	¼	⅜	½
Price, Single Thread..... Each	.40	.45	.50	.60
Size..... Inches	⅛	¼	⅜	½
Price, Double Thread..... Each	.55	.65	.75	.90

BIBB NOZZLE.

SINGLE THREAD.

T HANDLE.

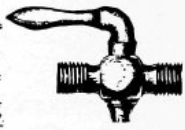
DOUBLE THREAD.

Size..... Inches	⅛	¼	⅜	½
Price, Single Thread...Inches	.70	.80	.90	1 00
Size..... Inches	⅛	¼	⅜	½
Price, Double Thread....Each	.80	1.00	1.10	1.35

SINGLE THREAD.

LEVER HANDLE.

DOUBLE THREAD.



Size..... Inches	⅛	¼	⅜	½
Price, Single Thread.....Each	.55	.60	65	.75
Size..... Inches	⅛	¼	⅜	½
Price, Double Thread....Each	.70	.80	.90	1 05

BIBB NOZZLE.

SINGLE THREAD.

LEVER HANDLE.

DOUBLE THREAD.

Size..... Inches	⅛	¼	⅜	½
Price, Single Thread, Each	.85	.95	1 05	1.15
Size..... Inches	⅛	¼	⅜	½
Price, Double Thread, Each	.95	1.15	1.25	1 50

FEMALE.

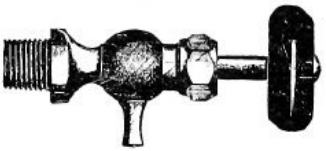
Size..... Inches	⅛	¼	⅜
T. Handle Female..... Each	.65	.70	.85
Lever Handle Female... "	.80	.85	1.00

FEMALE.

COMPRESSION GAGE COCKS.

PLAIN.

WITH STUFFING BOX.



Size, Chased Iron Pipe ..... Inches	⅜	½	¾
Standard Size ..... Each	$0.95	1.00	.....
Medium " ..... "	.....	1.20	1.35
Large Size..... "	.....	1.50	1.60

Size, Chased Iron Pipe ..... Inches	⅜	½	¾
Standard Size ..... Each	$1.20	1.30	1.45
Large Size..... "	.....	1.50	1.70

COMMON MISSISSIPPI GAGE COCK.

Size, Chased Iron Pipe ..... Inches	⅜	½	⅝	¾
Size, Blank Shank ..... Inches	¾	¾	⅞	1
Price ..... Each	$0.90	1.20	1.50	1.80

BALL GAUGE COCK.

REGISTER PATTERN.

Size, Chased Iron Pipe, inches.....	⅜	½	¾
Price..... each	$1 00	1 00	1 00

COMMON LUBRICATORS.

Number.....	00	0	1	2	3	4	5	6	7	8
Diameter, inches.....	1	1¼	1½	1¾	2	2¼	2½	3	3½	4
Pipe Thread, inch...	⅜	⅜	⅜	½	½	½	½	¾	¾	¾
Plain .....each	2 00	2 20	2 40	2 60	2 90	3 25	3 75	4 75	7 00	10 00
Plain, with Cock and Tube.....each	3 00	3 20	3 40	3 60	3 90	4 25	4 75	5 75	8 00	11 00

Lunkenheimer Drip and Sight-Feed Valves, Wiper Cups, Drip Troughs, Etc.

OILING DEVICES FOR ENGINE AND MACHINERY BEARINGS.

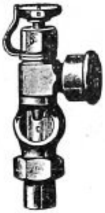


Fig. 594.
Angle Sight-Feed Valve with Union.

Fig. 503.
Adjustable Wiper Cup for Wick.

Fig. 504.
Adjustable Wiper Cup with Elbow Shank.

Fig. 578.
Adjustable Wiper Cup for Crank Pin.

Fig. 579.
Adjustable Plain Wiper Cup with Elbow Shank.

Fig. 505.
Plain Wiper Cup.

Fig. 552.
Horizontal Wick Wiper Cup

Fig. 506.
Oil Cup Wiper Tip.

Fig. 504.
Drip Trough.

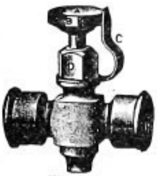


Fig. 499.
Cross Drip Valve.

Fig. 690.
Straight Drip Valve.

Fig. 500.
Angle Drip Valve.

Fig. 688.
Cross Sight-Feed Valve.

Fig. 501.
Straight Sight-Feed Valve.

Fig. 502.
Angle Sight-Feed Valve.

Fig. 689.
Cross Sight-Feed Valve with Union.

Fig. 593.
Straight Sight-Feed Valve with Union.

PRICE LIST.		Brass.	Nickel Plated.
Fig. 499.	Cross Drip Valve........each	1 50	1 75
Fig. 690.	Straight Drip Valve........each	1 25	1 50
Fig. 500.	Angle Drip Valve........each	1 25	1 50
Fig. 501.	Straight Sight-Feed Valve........each	2 00	2 25
Fig. 593.	Straight Sight-Feed Valve with Union........each	2 50	2 80
Fig. 502.	Angle Sight-Feed Valve........each	2 00	2 25
Fig. 594.	Angle Sight-Feed Valve with Union........each	2 50	2 80
Fig. 688.	Cross Sight-Feed Valve........each	2 30	2 60
Fig. 689.	Cross Sight-Feed Valve with Union........each	2 80	3 10
Fig. 503.	Adjustable Wiper Cup for Wick, ¼ or ⅜ inch Pipe........each	2 50	3 00
Fig. 504.	Adjustable Wiper Cup for Wick, Elbow Shank ¼ or ⅜ inch Pipe........each	3 00	3 50
Fig. 578.	Adjustable Crank Pin Wiper Cup, ¼ or ⅜ inch Pipe........each	2 50	3 00
Fig. 579.	Adjustable Plain Wiper Cup, Elbow Shank, ¼ or ⅜ inch Pipe........each	3 00	3 50
Fig. 552.	Horizontal Wick Wiper Cup, ¼ or ⅜ inch Pipe........each	2 00	2 30
Fig. 506.	Wiper Tips, ¼ or ⅜ inch Pipe........each	40	50
Fig. 506.	Wiper Tips, ½ inch Pipe........each	50	60

Fig. 505. Plain Wiper Cup.

Pipe Thread.	O. Diam.	Brass.	Nickel Pl.
¼	1⅛	1 00	1 20
⅜	1½	1 50	1 75
½	2	2 00	2 40

Fig. 507. Drip Troughs.

Length.	Pipe Th'd.	Rough	Finished.	Nickel Pl.
3 inches	¼	75	1 00	1 25
5 "	⅜	1 00	1 50	2 00
7 "	½	1 50	2 00	2 75
9 "	½	2 00	2 75	3 50

Gem" Plain Brass Grease Cup

PRICE LIST.

Number	00	0	1	2	3	4
Inside Diameter....inches	1	1¼	1½	2	2½	3
Shank Pipe Thread....inch	⅛	¼	¼	⅜	½	½
Capacity (Grease)....ounces	¼	⅔	1	2	3½	5
Finished Brass....each	70	90	115	150	215	290

"Pioneer" Slide Top Glass Oil Cup.

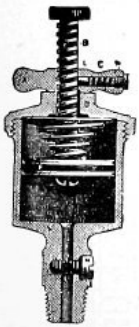
PRICE LIST.

NUMBER	000	00	0	1	1½	2	3	4	5	6
Outside Diameter of Glass....in.	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½
Height of Glass....in.	⅜	1	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Capacity....ounces	¼	½	⅝	1	1½	2½	4	5	10	18
Shank Pipe Thread....in	⅛	⅛	⅛	¼	¼	⅜	⅜	⅜	½	½
Finished Brass....each	70	75	80	1 00	1 25	1 50	1 90	2 40	3 10	4 00
Nickel Plated....each	80	85	95	1 20	1 50	1 75	2 20	2 75	3 50	4 50

"Royal" Sight-Feed Glass Oil Cup.

PRICE LIST.

NUMBER	000	00	0	1	1½	2	3	4	5	6
Outside Diameter of Glass....inches	1	1⅛	1¼	1½	1¾	2	2¼	2½	3	3½
Height of Glass....inches	⅜	1	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Capacity....ounces	¼	½	⅝	1	1½	2½	4	5	10	18
Shank Pipe Thread....inch	⅛	⅛	⅛	¼	¼	⅜	⅜	⅜	½	½
Finished Brass....each	95	1 10	1 25	1 50	1 75	2 10	2 55	3 15	3 90	4 80
Nickel Plated....each	1 05	1 20	1 40	1 70	2 00	2 35	2 85	3 50	4 30	5 30



"Ideal" Automatic Grease Cup.

PRICE LIST.

Number	00	0	1	2	3	4
Inside Diameter....inches	1	1¼	1½	2	2½	3
Shank Pipe Thread....inch	⅛	¼	¼	⅜	½	½
Capacity (Grease)....ounces	½	1	1½	3	4½	6½
Finished Brass....each	1 50	2 00	2 50	3 20	4 30	6 00
Nickel Plated....each	1 75	2 25	2 80	3 60	5 00	6 75

"Banner" Sight-Feed Lubricator.

For Gas Engines, Air Compressors, Etc.

PRICE LIS

Size..... Number	0	1	2	3	4	5	6
Diameter of Oil Chamber..... inches	1½	1¾	2	2¼	2½	3	3½
Capacity..... ounces	1	1½	2½	4	5	10	18
Shank Pipe Thread..... Inch	⅜	⅜	½	½	½	½	¾
Brass ..... each	3 50	4 00	5 00	6 00	8 00	10 00	12 00
All Finished and Nickel Plated..... each	4 20	5 00	6 00	7 25	9 50	12 00	14 00
Extra Sight-Feed Glasses..... per dozen	60	60	60	60	60	60	60

"Vulcan" Force-Feed Sight-Feed Lubricator

.....For Gas Engines, Air Compressors, Etc.

PRICE LIST.

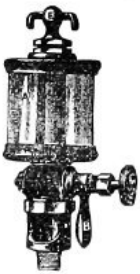
NUMBER.....	1	2	3	4
Outside Diameter of Cup..... Inches	1¾	2¼	2¾	3¼
Capacity (Oil)..... ounces	1½	3	4½	6¾
Shank Pipe Thread..... Inch	¾	¾	¾	¾
Brass..... each	5 00	6 00	8 00	10 00
All Finished and Nickel Plated..... each	6 00	7 25	9 50	12 00
Extra Sight-Feed Glasses..... per dozen	60	60	60	60

"Paragon" Glass-Body Sight-Feed Lubricator.

For Gas, Gasoline or Oil Engines.

PRICE LIST.

Size..... Number	1½	2	4	5	6	8
Outside Diameter of Glass..... Inches	1¾	2	2½	3	3½	4¾
Height of Glass..... Inches	1⅜	1⅜	2¾	3	4	5
Capacity (Oil)..... ounces	1½	2½	5	10	18	32
Shank Pipe Thread..... Inch	½	⅜	⅜	½	½	¾
Finished Brass..... each	2 00	2 80	4 00	5 40	7 00	14 00
Nickel-Plated..... each	2 40	3 25	4 60	6 25	8 20	16 40



"Mars" Gas Engine Lubricator.

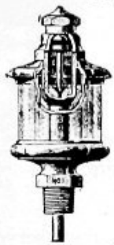
...Glass Body...

For Gas, Gasoline or Oil Engines, Air Compressors, Etc.

PRICE LIST.

Size..... Number	2	3	4	5	6
Diameter of Glass Body..... inches	2	2¾	2½	3	3½
Height of Glass Body..... Inches	1⅜	2⅝	2¾	3	4
Capacity..... ounces	2½	4	5	10	18
Shank Pipe Thread..... Inch	½	½	½	½	¾
Brass..... each	5 00	6 00	8 00	10 00	12 00
All Finished and Nickel Plated..... each	6 00	7 25	9 50	12 00	14 00
Extra Sight-Feed Glasses..... per dozen	60	60	60	60	60

AUTOMATIC ROD CUPS FOR ENGINE CRANK PINS.



-Screw Feed. -Needle-Valve Feed.

The Automatic Screw Feed and Needle Valve Rod Cups are unexcelled for use on engine or other crank bearings. They are simple, compact, strong and well made, with no complicated parts, thus are not liable to get out of order, nor will they throw and waste oil, as is the case with other makes. Thousands of them are in use today, and are giving excellent satisfaction. The Needle Valve Cups are not made smaller than No. 1. When ordering mention whether Screw-Feed or Needle Valve-Feed are wanted.

No.	0	1	1½	2	3	4
O. D. of Glass......In.	1¼	1½	1¾	2	2¼	2½
Height of Glass...... "	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜
Capacity......Oz.	⅝	1	1½	2½	4	5
Pipe Thread......In.	⅛	¼	¼	⅜	⅜	⅜
Finished Brass......Each	1.10	1.50	2.00	2.50	3.00	4.00
Nickel Plated...... "	1.25	1.70	2.25	2.75	3.30	4.35
Extra Glasses...... "	.08	.10	.10	.12	.15	.25

SAFETY AUTOMATIC DOUBLE-FEED CRANK-PIN OILERS.

Size No.	1	1½	2	3	4	5
O. D. of Glass......In.	1¼	1½	1¾	2	2¼	2½
Height of Glass...... "	1⅛	1⅜	1½	1¾	2⅛	2⅜
Capacity......Oz.	½	⅝	1¼	2¼	4	5
Pipe Thread of Shank......In.	¼	¼	⅜	⅜	½	½
Brass Finish......Each	1.50	1.75	2.00	2.50	3.00	4.00
Nickel Plated...... "	1.90	2.00	2.50	3.00	3.60	4.70
Extra Glasses, net...... "	.08	.10	.11	.12	.15	.25
Extra Cork Washers. net, Per Doz.	.12	.18	.24	.30	.36	.40

DIRECTIONS TO SET FEED.—Regulate the feed by turning the milled cover, so that when the flattened side of thumb-nut engages the spring the desired feed is obtained. When the desired feed is once established, it can instantly be shut off or put on by turning the milled thumb-nut, i. e., to the right, feed off; to the left, feed on.

"VICTOR" INDEX GLASS OIL CUP.

The "Victor" Index Glass Oil Cup is provided with a simple "index" device for regulating the feed of oil, and has an indicator arm pivoted on the stem and turning on the lid to mark the notch giving the desired feed. The feed can be instantly turned off, and on again by replacing the lever in the notch of the indicator arm. When the index arm is closed the lever can be left to stand up out of the notch, thus acting as an indicator, to show from a distance that the feed is shut off. This cup is exactly like the "Crown," but without sight-feed.

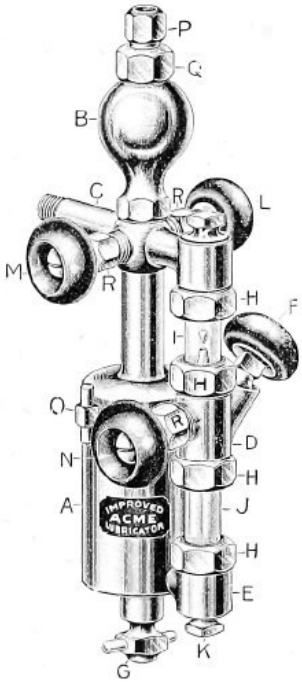
No.	0	1	1½	2	3	4	5	6
O. D. of Glass..In.	1¼	1½	1¾	2	2¼	2½	3	3½
Height of Glass "	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Capacity......Oz.	⅝	1	1½	2½	4	5	10	18
Pipe Thread....In.	⅛	¼	¼	⅜	⅜	⅜	½	½
Finished Brass, Ea.	1.00	1.20	1.45	1.75	2.15	2.70	3.40	4.30
Nickel Plated.. "	1.15	1.40	1.70	2.00	2.45	3.05	3.80	4.80
Extra Glasses.. "	.08	.10	.10	.12	.15	.25	.35	.65

CROWN INDEX SIGHT-FEED GLASS OIL CUP.

No.	0	1	1½	2	3	4	5	6
O. D. of Glass..In.	1¼	1½	1¾	2	2¼	2½	3	3½
Height of Glass "	1⅛	1⅜	1⅝	1⅞	2⅛	2⅜	3	4
Capacity......Oz.	⅝	1	1½	2½	4	5	10	18
Pipe Thread....In.	⅛	¼	¼	⅜	⅜	⅜	½	½
Finished Brass, Ea.	1.25	1.50	1.75	2.10	2.55	3.15	3.90	4.80
Nickel Plated.. "	1.40	1.70	2.00	2.35	2.85	3.50	4.30	5.30
Extra Glasses.. "	.08	.10	.10	.12	.15	.25	.35	.65

THE "ACME" LUBRICATOR.

CLASS A.



Engineers and Steam Users, please note the Following Facts why the Improved ACME is the Best:

As the Sight-feed is placed on top of the reservoir we claim it contains the following *undeniable advantages:*

1st. The Sight-feed can be seen from *any direction* and at a *greater distance* than when placed down on the side as in other lubricators.

2d. The glasses on the Improved Acme being one above the other, it will be seen that they are in the best possible position for observation.

3d. There are *no tubes* or *pipes* in the interior of the cups to *stop* or *clog* up as in other lubricators. By placing the Sight-feed on top we *remove* the necessity for any tubes, and for that reason can feed *any kind of oil*, no matter how heavy, and where a lubricator has to be placed where it is subject to drafts or changes of temperature, the ACME, with its *no-tube* feature, will be best *appreciated.*

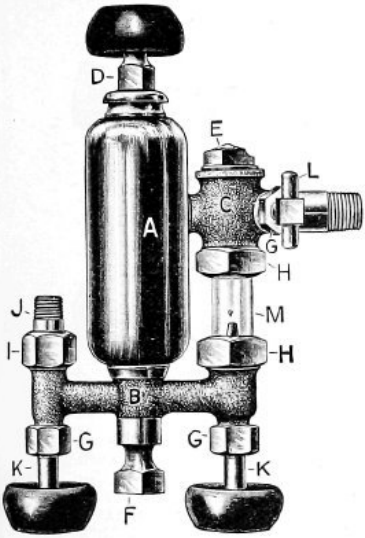
4th. By having the Sight-feed on top, all the oil can be used before refilling cup.

5th. All our Improved ACME Lubricators have our Patent Slip Joint Connection for coupling the condensing pipe to the condenser, allowing of an adjustment should a mistake be made in drilling the holes in steam pipe for connecting, assuring tight joints, and it is always a *convenience* in making connections.

These Lubricators have merits that will be appreciated, and when ordering specify the ACME, and when once tried you will *use no other.* They are in use in some of the largest institutions in this country and are giving *entire satisfaction.*

	Brass.	Nickel Plated.
½ pint	$17 00	$20 00
½ "	22 00	25 00
1 "	30 00	35 00
1 quart	45 00	50 00
½ gallon	60 00	65 00
1 "	75 00	80 00

Brass Condensing Pipe and Angle Valve furnished when desired at 75c net extra.



THE "EUREKA" SIGHT-FEED LUBRICATOR.

DOUBLE CONNECTION.

The Eureka is one of the neatest, best designed and most reliable Sight-Feed Lubricators that has ever been placed on the market for the price. Every machine is thoroughly tested before leaving the works, and guaranteed to work if properly attached.

Brass.

	⅛ pt.	¼ pt.	⅓ pt.	½ pt.	1 pt.	1 qt.
Price,	$8.00	$9.00	$10.00	$12.00	$15.00	$20.00

Nickel Plated.

	⅛ pt.	¼ pt.	⅓ pt.	½ pt.	1 pt.	1 qt.
Price,	$9.00	$10.00	$11.00	$13.50	$17.00	$22.00

THE ROBERTS' NEVER-FAIL SIGHT-FEED LUBRICATOR.

SINGLE CONNECTION.

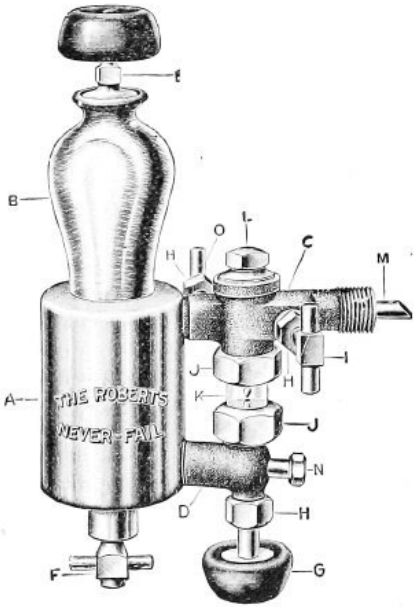
Convenient, Substantial, Handsome, Full Capacity, Adapted to all Temperatures, Easy to Keep Clean, Reliable in Operation, and Not Expensive.

Brass.

	⅛ pt.	¼ pt.	⅓ pt.	½ pt.	1 pt.	1 qt.
List,	$9.00	$10.00	$11.00	$12.00	$18.00	$23.00

Nickel Plated.

	⅛ pt.	¼ pt.	⅓ pt.	½ pt.	1 pt.	1 qt.
List,	$10.00	$11.00	$12.50	$14.00	$20.00	$25.00



WATER GAGES.

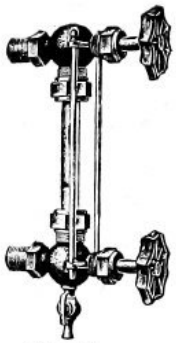


Fig. 477.

Fig. 478.

Fig. 479.

FIG. 477. ROUGH BODY, TWO GUARDS, IRON WHEELS.

Screwed for	⅜	inch pipe, with glass	½	x 10	inches	Each	$2.75
"	½	" "	⅝	x 12	"	"	3.00
"	¾	" "	¾	x 16	"	"	4.50

FIG. 478. FINISHED BODY, TWO GUARDS, WOOD WHEELS.

Screwed for	⅜	inch pipe, with glass	½	x 10	inches	Each	$3.75
"	½	" "	⅝	x 12	"	"	4.25
"	½	" "	⅝	x 12	" heavy pattern	"	7.00
"	¾	" "	¾	x 16	"	"	5.75
"	¾	" "	¾	x 16	" heavy pattern	"	8.00

FIG. 479. FINISHED BODY, FOUR GUARDS, WOOD WHEELS.

Screwed for	½	inch pipe, with glass	⅝	x 12	inches	Each	$5.25
"	¾	" "	¾	x 16	"	"	6.00
"	¾	" "	¾	x 16	" heavy pattern	"	10.00

Fig. 480.

SELF CLEANING.

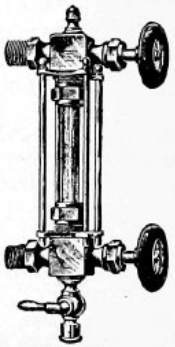


Fig. 481.

FIG. 480. FINISHED BODY, FOUR GUARDS, IRON WHEELS.

Screwed for	½	inch pipe, with glass	⅝	x 12	inches	Each	$4.50
"	¾	" "	¾	x 16	"	"	5.25

FIG. 481. FINISHED BODY, FOUR GUARDS, WOOD AND IRON WHEELS.

Screwed for	½	inch pipe, with glass	⅝	x 12	inches, wood wheels..	Each	$6.00	Iron wheels..	Each	$5.25
"	¾	" "	¾	x 16	" " " "		8.00	" " "		7.50

GENUINE SCOTCH GAUGE GLASSES.

LENGTH.	EXTERNAL DIAMETER.			
Inches.	⅜ and ½	⅝	¾	1 Inch
10	$3.00	3.60	5.04	6.12
11	3.24	3.96	5.64	6.72
12	3.60	4.32	6.12	7.32
13	3.84	4.80	6.60	7.92
14	4.20	5.16	7.08	8.52
15	4.44	5.52	7.56	9.12
16	4.80	5.88	8.16	9.72
17	5.04	6.24	8.64	10.32
18	5.40	6.60	9.12	10.92
19	5.64	7.08	9.60	11.52
20	6.00	7.44	10.20	12.12
22	6.60	8.16	11.16	13.44
24	7.20	8.88	12.12	14.64
30	9.00	11.16	15.24	18.24
36	10.80	13.44	18.24	21.96
48	14.52	18.00	24.36	29.16
60	18.12	22.56	30.48	36.48
72	21.84	27.12	36.48	43.80

60 x 1¼ inches, $60.00

These Gage Glasses are imported from Perth, Scotland, size labeled on end of each package, making them more desirable for stock. Each glass bears the above trade-mark. Lengths not regular, charged the price of next longer tubes of same diameter. Sizes over 24 inches special discount

GILBERT'S SELF-PACKING GAGE GLASS PRESERVER.

Fig. 488.

No. 1 ½ inch, per box one dozen
No. 2 ⅝ inch, per box one dozen
No. 3 ¾ inch, per box one dozen
No. 4 1 or 1¼ inch, per box ½ dozen

Price, 60 cents per box.

COMMON RUBBER WASHERS.

TO FIT GLASS TUBES FOR WATER GAGES.

SIZE	Price per Dozen
½ inch	$0.20
⅝ "	.25
¾ "	.30
⅞ "	.45
1 "	.65

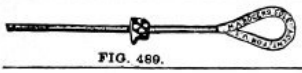


FIG. 489.

"FAVORITE" GLASS-TUBE CUTTER.

Price..... Each, $0.20

BROCTON GLASS-TUBE CUTTER.

Price..... Each, $1.50

FIG. 490.

FIG. 491.

CHESTERTON'S GLASS-TUBE CUTTER.

Nickel Plated..... Each, $2.00

W. & C. GLASS-TUBE CUTTER.

Price..... Each, $1.50

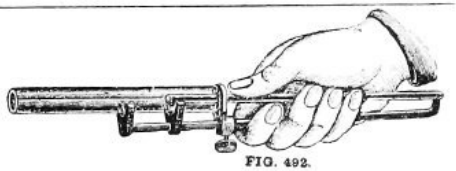
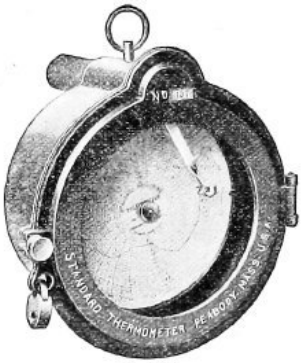


FIG. 492.

RECORDING THERMOMETER.



No. 300.
DAILY OR WEEKLY DIAL.

Registering accurately the various changes of temperature, indispensable for hot drying rooms, dry kilns, cold storage plants, or places where a certain fixed range of temperature must be maintained and a record kept.

The extension can be made of any length desired up to thirty inches. It is fitted with 1¼ inch pipe thread nipple for insertion.

In ordering, *please state the range of temperature to be covered,* which can be between 0 and 500 Fahr., either weekly or daily dial, and thickness of wall through which this extension is to pass.

List price.....$35 00

HOT WATER THERMOMETERS.

MADE WITH STRAIGHT OR ANGLE STEMS, AND WITH SILVERED OR BLACK DIALS.

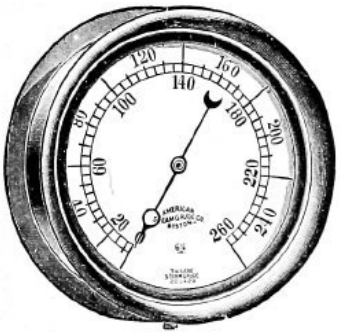
To indicate accurately this Thermometer must have the entire metallic stem below the thread fully immersed in, or subjected to, a continuous circulation of the hot water. Should not be screwed into Tees, Elbows or Nipples, where there is no circulation.

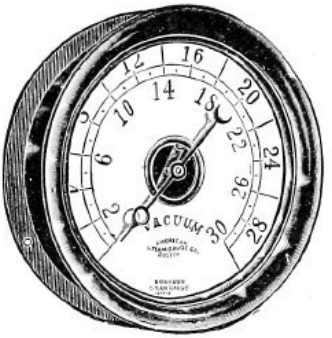
Straight Stem Thermometer.....Per Doz., $36.00
Angle " " ..... " " 42.00

AMERICAN IMPROVED SINGLE SPRING BOURDON PRESSURE AND VACUUM GAUGES.

WITH NON-CORROSIVE MOVEMENTS.

Springs of Solid Drawn Tube.





Original Bourdon Gauges.

PRICES, INCLUDING COCK.

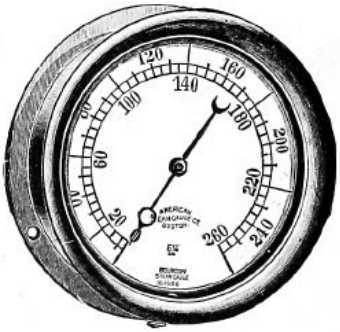
Size.	Iron Case, Brass Ring.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.	Brass Deep Case, O. G. or Oct. Ring.	N. P. Deep Case, O. G. or Oct. Ring.
24 inch dial	$200 00	$206 00	$260 00	$280 00		
20 "	135 00	140 00	190 00	205 00		
18 "	110 00	113 00	155 00	167 50		
16 "	90 00	92 00	125 00	135 00		
14 "	75 00	76 50	100 00	107 50		
12 "	50 00	51 50	75 00	79 00	$80 00	$84 00
10 "	32 00	33 00	40 00	43 00	44 00	47 00
8½ "	22 00	22 75	30 00	32 50	33 50	36 00
6¾ "	16 00	16 60	20 00	22 00	23 00	25 00
6 "	13 00	13 50	16 00	17 50	18 50	20 00
5½ "	10 00	10 25	12 00	13 25	13 75	15 00
5 "	8 00	8 20	11 00	12 00	12 50	13 50
4½ "	8 00	8 20	10 00	11 00	11 50	12 50
3½ "	7 00	7 18	9 00	9 75	10 25	11 00
3 "	6 00	6 15	8 00	8 60	9 25	9 75
2½ "	6 00	6 15	8 00	8 60	9 25	9 75
2 "	6 00	6 15	8 00	8 60	9 25	9 75

Iron case Gauges with spun brass jacket sold at brass case list and discount.

AMERICAN LANE'S IMPROVED DOUBLE SPRING BOURDON PRESSURE GAUGES.

WITH NON-CORROSIVE MOVEMENTS.

Springs of Solid Drawn Tube.



Original Lane Gauge.

The Lane's Improvement, which prevents vibration of the hand, freezing up of the spring in case of exposure, removes all objectionable features of the Bourdon Gauge.

Gauges graduated for steam or water pressure, as desired.

We can furnish the brazed or seamless tube, as desired, but recommend the seamless.

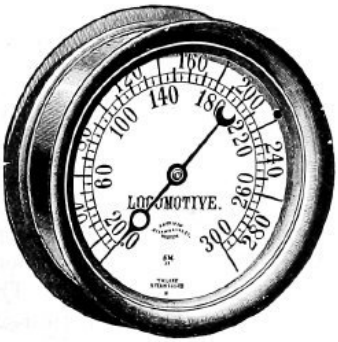
PRICES, INCLUDING COCK.

Size.	Iron Case, Japanned.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.	Brass Deep Case, O. G. or Oct. Ring.	N. P. Deep Case, O. G. or Oct. Ring.
24 inch dial..	$230 00	$236 00	$280 00	$300 00		
20 " ..	155 00	160 00	200 00	215 00		
18 " ..	125 00	128 00	170 00	182 50		
16 " ..	105 00	107 00	140 00	150 00		
14 " ..	90 00	91 50	115 00	122 50		
12 " ..	55 00	56 50	80 00	84 00	$85 00	$89 00
10 " ..	37 00	38 00	45 00	48 00	49 00	52 00
8½ " ..	25 00	25 75	34 00	36 50	37 50	40 00
6¾ " ..	18 00	18 60	22 00	24 00	25 00	27 00
6 " ..	15 00	15 50	18 00	19 50	20 75	22 25
5½ " ..	12 00	12 25	14 00	15 25	16 25	17 50
5 " ..	11 00	11 20	13 00	14 00	15 00	16 00
4½ " ..	10 00	10 20	12 00	13 00	13 75	14 75

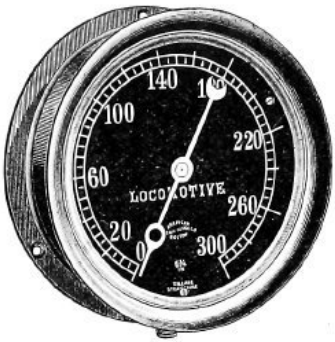
AMERICAN LOCOMOTIVE GAUGE.

WITH NON-CORROSIVE MOVEMENTS.

Springs of Solid Drawn Tube.



Double Spring
Locomotive Steam Gauge.
WHITE DIAL.



Double Spring
Locomotive Steam Gauge.
BLACK DIAL.

We are now manufacturing a locomotive gauge with solid drawn springs of superior quality, the movement being non-corrosive, which we guarantee to withstand the excessive wear liable to all locomotive gauges. We warrant our gauges in every particular to be superior in accuracy, durability and finish. We are prepared to fill orders promptly, and, as most parts of the instrument are interchangeable, to make repairs with dispatch. The ring of this gauge is screwed down to a shoulder and makes case perfectly dust-proof.

PRICES, INCLUDING COCK.

Size.	Iron Case. Japanned.	Iron Case. N. P. Ring.	Brass Case.	N. P. Case.
6 inch.....	$15 00	$15 50	$18 00	$19 50
6¾ "	18 00	18 60	22 00	24 00
8½ "	25 00	25 75	34 00	36 50
10 "	37 00	38 00	45 00	48 00
12 "	55 00	56 50	80 00	84 00

AMERICAN HYDRAULIC GAUGE.

These gauges are made for pressures from 1,000 to 20,000 lbs. per square inch. The springs are made of heavy solid bar steel turned and bored to size. They are of the Bourdon style and are absolutely reliable. They are in use in all the large railroad shops, sugar refineries and cotton-seed oil mills in the country.

These gauges will be made with connections through the back, when so ordered, without extra charge.

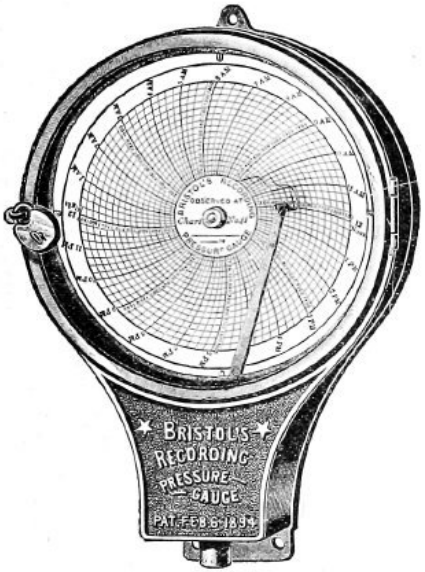
PRICES.

Size.	Iron Case, Brass Ring.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.
12 in. dial	$110 00	$111 50	$125 00	$129 00
10 "	90 00	91 00	100 00	103 00
8½ "	70 00	70 75	80 00	82 50
6¾ "	50 00	50 60	60 00	62 00
6 "	35 00	35 50	40 00	41 50
FOR PRESSURES NOT EXCEEDING 2,500 LBS.				
5 in. dial	$30 00	$30 50	$35 00	$36 00
4½ "	25 00	25 40	30 00	31 00

For maximum hand add $5.00 to the list.
No extra charge for marking tons on ram on dials.

N. B.—A CHECK VALVE is almost indispensable in using a hydraulic gauge, as the pressure is often suddenly removed, and the momentum of the hand will throw the gauge out of the gear and otherwise damage it. A check valve prevents any trouble of this kind.

BRISTOL'S STANDARD RECORDING PRESSURE GAUGES.

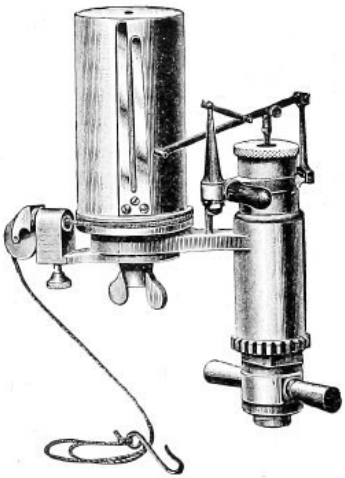


8 INCH CHART.

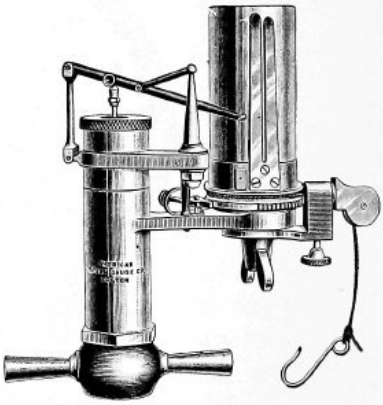
Catalogue No.	Chart No.	Graduations.	Working Range.	Total Scale.	One Revolution of Chart.	List Price.	Remarks.
9100	2015	1/20 in. head of water	0 to 1½ inches	0 to 2 inches	24 hrs.	$50 00	For gas or air
9101	14	1/10 " " " "	0 " 3 "	0 " 4 "	24 "	50 00	" " " "
9158	2031	1/10 " " " "	0 " 4½ "	0 " 6 "	24 "	50 00	" " " "
9102	19	1/5 " " " "	0 " 6 "	0 " 8 "	24 "	50 00	" " " "
9103	24	1/5 " " " "	0 " 9 "	0 " 12 "	24 "	50 00	" " " "
9116	75	10 " " " "	0 " 120 "	0 " 180 "	24 "	50 00	
9117	35	10 " " " "	0 " 150 "	0 " 200 "	24 "	50 00	
9118	34	10 " " " "	0 " 150 "	0 " 200 "	6 "	50 00	
9119	45	10 " " " "	0 " 150 "	0 " 200 "	1 "	50 00	
9120	76	10 " " " "	0 " 175 "	0 " 230 "	24 "	50 00	
9150	2032	½ foot " " "	0 " 20 feet	0 " 25 feet	24 "	50 00	
9129	2005	2 feet " " "	0 " 40 "	0 " 58 "	24 "	50 00	
9130	92	5 " " " "	0 " 75 "	0 " 100 "	24 "	50 00	
9131	68	2 " " " "	110 " 130 "	110 " 140 "	24 "	60 00	
9132	82	10 " " " "	0 " 150 "	0 " 200 "	24 "	50 00	
9133	77	10 " " " "	0 " 225 "	0 " 320 "	24 "	50 00	
9134	78	20 " " " "	0 " 300 "	0 " 400 "	24 "	50 00	
9135	61	1/20 Atmosphere	¾ Atmosphere	1 Atmosphere	24 "	50 00	
9136	87	1/10 "	1¾ "	2 "	24 "	50 00	
9137	84	1/8 "	5 "	6 "	24 "	50 00	

We can furnish Gauges of every description.

STEAM ENGINE INDICATORS.



No. 1.



No. 2.

American Thompson Improved Indicator (either No. 1 or No. 2 instrument), with one cylinder spring, two single cocks (or one 3-way cock, as preferred), one scale, all necessary wrenches, screwdriver, bottle of watch oil, all inclosed in a neat mahogany box; also copy of Pray's "Twenty Years with the Indicator" ..... $ 85 00

American Thompson Improved Gas and Oil Engine Indicator, with fixtures as enumerated above 85 00

American Thompson Improved Indicator, with Ideal Reducing Wheel and fixtures as enumerated above 100 00

American Thompson Improved Ammonia Indicator, with fixtures as enumerated above 110 00

American Thompson Improved Indicator, with electrical attachment and fixtures as enumerated above 110 00

American Thompson Improved Indicator, with electrical attachment and Ideal Reducing Wheel and fixtures as enumerated above 125 00

Extra Cylinder Springs 5 00

" Pistons 10 00

" Drum Springs ..... net, 50

" Boxwood Scale, 1 graduation ..... " 50

" " " triangular, with 3 graduations ..... " 1 00

" Steel Scale, 2 graduations ..... " 1 00

" " " 4 " ..... " 1 25

American Ideal Reducing Wheel 15 00

Pantograph 10 00

Planimeter 15 00

Single Carrying Pulley 60

Double " " 1 20

Metallic Cards ..... per thousand, net, 5 00

Common " ..... " " " 2 50

Indicator Cord ..... per Hank (21 feet), " 15

New Improved American Detent Motion ..... " 10 00

GARDNER GOVERNORS.

CLASS A.
STANDARD.

CLASS B.
STANDARD.

CLASS B—SPRING.
With Speeder and Hand Lever.

TABLE OF DIMENSIONS OF CLASS A AND B, STANDARD GOVERNOR.

Size of Governor—Diameter of Opening	3/4	1	1 1/4	1 1/2	2	2 1/4	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	9	10
Diameter of Base Flange	Screw'd	Screw'd	Screw'd	5 1/2	7	7	8	9	9	10	10	12	14	15	17	18	19
" " Side "	"	"	"	Screw'd	Screw'd	7	7	8	9	10	10	11	13	14	15	16	17
Largest Radius of Balls	4	4	5	5	6	6	6 1/2	7 1/2	7 1/2	8 1/2	8 1/2	10	11	12	12	15	15
From Center to Side Flange	2 1/4	2 1/2	3	3 1/2	5	5	5 1/2	6	6 1/2	6 1/2	7	7 1/2	8 1/2	9	10	11	14
" Base to Center of Inlet	2 1/4	2 1/2	3	4	5	5 1/2	5 3/4	6	6 1/2	6 1/2	7	8	8 1/2	9 1/2	10 1/2	11	15
Extreme Height	15	15	20	21	25	26	28	32	34	37	38	43	44	51	53	62	67
From Center to End of Shaft	9	9	11	11	13	13	15	15	17	17	17	21	21	25	25	28	28
Diameter of Pulley	2	2	3	3	5	5	5	5 1/2	5 1/2	6	6	7	7	10	11	12	12
Width of Belt	1 1/4	1 1/4	1 1/2	1 1/2	2	2	2	2	2	2 1/2	2 1/2	3	3	3	3	3	3
Number of Revolutions	300	300	250	250	200	200	200	170	170	160	160	150	150	130	130	130	115
Diam. Cylinder—300 ft. Piston Speed	4	5	6	7	9	10	12	14	16	18	20	22	26	31	36	40	45
" " 400 " " "	3	4	5	6	8	9	10	12	14	16	18	20	23	27	31	35	39
" " 500 " " "	.....	3 1/2	4 1/2	5	7	8	9	10	12	14	16	18	21	24	28	31	35
" " 600 " " "	.....	.....	4	4 1/2	6	7	8	9	11	13	15	16	19	22	25	28	32

TABLE OF DIMENSIONS OF CLASS A AND B, SPRING GOVERNORS.

Size of Governor—Diameter of Opening	1/2	3/4	1	1 1/4	1 1/2	2	2 1/4	2 1/2	3	3 1/2	4	4 1/2	5
Diameter of Base Flange	Screwed	Screwed	Screwed	Screwed	5 1/2	7	7	8	9	9	10	10	12
" " Side "	"	"	"	"	Screwed	Screwed	7	7	8	9	10	10	11
Height—Inches	12	13	13 1/2	17 1/2	22	23	24	27	29	30	35	36	37
Radius of Balls	2 1/2	2 1/2	2 1/2	3 1/2	4	4	4	5	5	5	5 1/2	6	6
Length of Shaft	8	8	8	11	11	13	13	15	15	15	16	16	18
Diameter of Pulley	1 1/2	1 1/2	1 1/2	2	2 1/2	2 1/2	2 1/2	3 1/2	3 1/2	3 1/2	4 1/2	4 1/2	4 1/2
Width of Belt	1	1	1	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2	2 1/2	2 1/2	2 1/2
Center to Side of Chamber	1 3/4	2 1/4	2 1/2	3	3 1/2	5	5	5 1/2	6	6 1/2	6 3/4	7	7 1/2
Base to Center " "	1 3/4	2 1/4	2 1/2	3	4	5	5 1/2	5 1/2	6	6 1/2	6 1/2	7	8
Number of Revolutions	600	600	600	450	400	400	400	350	350	350	275	275	275

PRICE LIST OF JUDSON, PICKERING, WATERS AND GARDNER GOVERNORS.

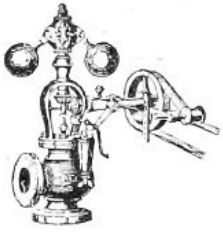
Size of Governor—Diameter of Opening	1/2	3/4	1	1 1/4	1 1/2	2	2 1/4	2 1/2	2 3/4	3
Price, Class B, Plain	$14.00	16.00	18.00	21.00	25.00	30.00	35.00	40.00	45.00	50.00
" " B, Finished	16.00	18.00	20.00	24.00	29.00	34.00	40.00	45.00	51.00	58.00
" " A, Plain	....	....	21.00	24.50	29.50	36.00	42.00	48.00	53.00	59.00
" " A, Finished	....	....	23.00	27.50	33.50	40.00	47.00	53.00	59.00	67.00

Size of Governor—Diameter of Opening	3 1/2	4	4 1/2	5	5 1/2	6	7	8	9	10
Price, Class B, Plain	$60.00	71.00	83.00	94.00	108.00	122.00	150.00	185.00	215.00	240.00
" " B, Finished	69.00	81.00	94.00	106.00	121.00	136.00	160.00	202.00	235.00	260.00
" " A, Plain	71.00	83.00	96.00	109.00	124.00	140.00	170.00	210.00	241.00	270.00
" " A, Finished	80.00	93.00	107.00	121.00	137.00	154.00	186.00	227.00	261.00	290.00

When ordering Governors, state which class is wanted, Standard or Spring, Plain or Finished,
Speeder attachment on Pickering Governor costs extra.
Class B is without Automatic Stop.
Class A is with Automatic Stop.

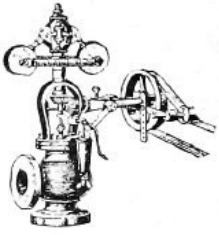
JUDSON GOVERNORS.

CLASS A, STANDARD. Medium Speed.



CLASS B, STANDARD. Medium Speed.

CLASS A, SPRING. High Speed.



CLASS B, SPRING. High Speed.

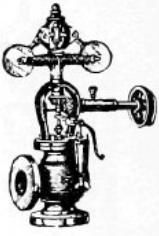


TABLE OF DIMENSIONS.

Size of Governor—Diameter of Opening	½	¾	1	1¼	1½	2	2½	2½	2¾	3
Diameter Base Flange	.....	3¼	4½	5	5¾	6½	7½	7½	8½	9
" Side "	Screwed	Screwed	Screwed	Screwed	Screwed	Screwed	6	Screwed 6½	7	Screwed 8
From Center to Side Flange	1⅝	2	2⅜	2½	2¾	3	4¼	4¾	5¼	5¾
" Base to Center of Inlet	2	2¼	2⅜	3	3⅜	4	4½	4½	5⅜	5¾
Length (Horizontal) Chambers 13 D and E	3¾	4½	5	5¾	5¾	7¾	.....	9	.....	10¾
From Center to End of Shaft	7	7	7½	10¼	11¾	12½	13⅜	14¼	14¾	15½
Extreme Height	11½	12¼	13⅛	18¾	20½	23	26¾	28	28¾	32¼
Greatest Swing of Balls	8½	8½	8½	11	11⅞	11⅞	14½	16¼	16¼	17⅜
Speed Standard Governor	260	260	240	210	185	185	175	150	150	140
" Spring "	305	300	280	270	255	270	230	215	215	205
Diameter Pulley on Spring Governor	2½	2½	2½	3	3½	3½	4	4½	4½	5¼
" " " Standard "	2½	2½	3	3½	4	4½	5	5	5	6
Width of Belt	1¼	1¼	1¾	1¾	1¾	1½	2	2	2	2
Diameter Cylinders 300 ft. Piston Speed	3	4	5	6	7	9	10	12	12	14
" " 400 " "	2½	3	4	5	6	8	9	10	11	12
" " 500 " "	.....	.....	3½	4½	5	7	8	9	10	10
" " 600 " "	.....	.....	.....	4	4½	6	7	8	9	9

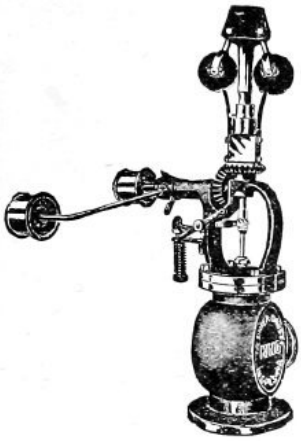
Size of Governor—Diameter of Opening	3½	4	4½	5	5½	6	7	8	9	10
Diameter Base Flange	10	11	11½	12	13	14	15½	17	18	20
" Side "	Screwed 9	10	10½	11	12	13	14½	16	17	19
From Center to Side Flange	6½	7	7	7½	7⅝	8½	9	10	11	12¼
" Base to Center of Inlet	6½	7½	7½	7¾	8¾	9½	9½	10⅜	11¾	13½
Length (Horizontal) Chambers 13 D and E	12	12¾	14	15	.....	16⅞	.....	19¾	22	25
From Center to End of Shaft	17	18½	21	21	22	23	23	24	26	26
Extreme Height	35½	38	42	42½	48	50	51	55½	59	63
Greatest Swing of Balls	19¼	20⅝	23½	23⅛	26½	30⅝	30⅝	34¼	34¼	38
Speed Standard Governor	135	135	130	125	110	105	105	100	100	100
" Spring "	200	185	175	175	165	145	145	140	140	135
Diameter Pulley on Spring Governor	6	6½	7½	7½	9	10	10½	12	14	14
" " " Standard "	6½	7½	8	8	10	11	11	14	16	16
Width of Belt	2	2½	2½	2½	2½	3	3	3	3½	3½
Diameter Cylinders 300 ft. Piston Speed	16	18	20	22	24	26	31	36	40	45
" " 400 " "	14	16	18	20	22	23	27	31	35	39
" " 500 " "	12	14	16	18	20	21	24	28	31	35
" " 600 " "	11	13	15	16	18	19	22	25	28	32

All Governors are complete with Speeder, turned flanged Pulley, Sawyer's Lever. No extras.

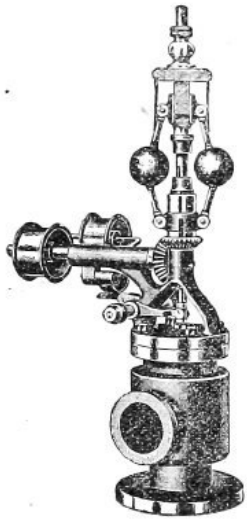
In ordering, if we are informed of speed of engine and diameter of pulley on engine shaft from which governor is driven, will put proper size of pulley on governor, otherwise the size of pulley mentioned in table will be furnished with each governor. When Stop Valves are ordered, angle will be sent unless globe is specified.

"KING" AUTOMATIC SAFETY GOVERNOR

Is guaranteed to give closer regulation than any other governor. It is made for all styles of connections, for all classes of throttling engines, with or without automatic stops, and is equipped with Sawyer's lever and speeder.



THE "KING."



THE "HOOSIER" GOVERNOR

Is so constructed that the speed of the engine can be varied 150 revolutions while engine is in motion. This attachment permits the engine to be speeded up for heavy work or slowed down for light work, thereby enabling the saving of considerable fuel.

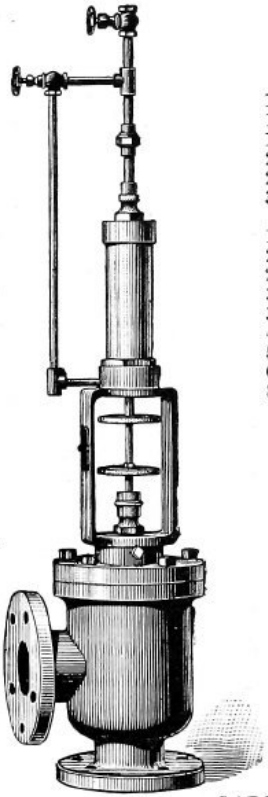
PRICE LIST OF THE "KING" AND "HOOSIER" GOVERNORS.

Size.....Inches	½	¾	1	1¼	1½	2	2¼	2½	3	3½	4	5
Plain.....Each	$16.00	18.00	20.00	22.00	25.00	30.00	35.00	40.00	50.00	60.00	71.00	94.00
Finished..... "	18.00	20.00	22.00	25.00	29.00	34.00	40.00	45.00	58.00	69.00	81.00	106.00
Automatic Stop, extra. "	2.00	2.00	3.00	3.50	4.50	6.00	7.00	8.00	9.00	11.00	12.00	15.00

TABLE OF DIMENSIONS OF THE "KING" AND "HOOSIER" GOVERNORS.

Size of Governor .... Inches	¾	1	1¼	1½	2	2¼	2½	3	3½	4	4½	5
Diameter of base flange.....	4½	5	5	5½	7	7	8	9	9	10	11	12
Diameter of side flange	4½	5	5	5½	6½	7	7	8	8	9	9½	10
Height in inches.....	15½	17	20½	21	27	27½	27½	34	34½	35	40½	41½
Radius of balls.....	2½	2¾	3	3⅜	3¾	3¾	3⅞	4¾	5	5⅛	5¾	5⅞
Length of shaft	6	7	8	9	12	12	13	14	15	15	16	17
Diameter of pulley.....	1⅜	1½	2	2	2½	2½	2½	3½	3⅜	3½	4	4
Width of belt.....	¾	¾	1	1	1½	1½	1½	2	2	2	2½	2½
Center of body to side flange.	2	2½	3⅛	3¼	4½	4¾	4¾	5½	5¾	6½	7	7½
Center of body to base flange.	2⅜	2¾	3¼	3½	4½	5	5	6⅛	6½	6⅞	7	7½
Number of revolutions.....	575	575	475	475	400	400	400	330	300	300	275	275

AUTOMATIC PUMP GOVERNORS.



Fisher.

FISHER.

SCREWED.

½ inch	$25 00
¾ "	27 50
1 "	30 00
1¼ "	35 00
1½ "	42 50
2 "	50 00
2½ "	58 00
3 "	70 00

FLANGED.

1½ inch	$ 45 00
2 "	50 00
2½ "	60 00
3 "	75 00
3½ "	87 50
4 "	100 00
5 "	125 00
6 "	150 00
8 "	225 00

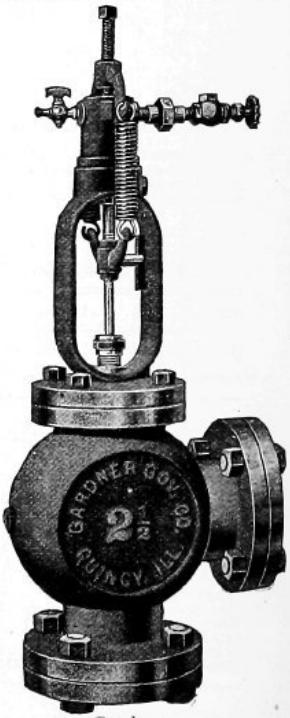
GARDNER.

SCREWED.

½ inch	$25 00
¾ "	27 50
1 "	30 00
1¼ "	35 00
1½ "	42 50
2 "	50 00
2½ "	58 00

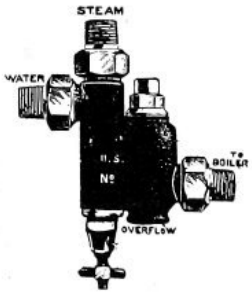
FLANGED.

2 inch	$ 50 00
2½ "	60 00
3 "	75 00
3½ "	87 50
4 "	100 00
5 "	125 00
6 "	150 00



Gardner.

U. S. AUTOMATIC INJECTOR.



Size	All Pipe Connections.	Capacity Gallons Per Hour. Max.	Capacity Gallons Per Hour. Min.	Horse Power	Price
00	¼ inch.	36	15	1 to 4	$13.00
0	⅜ "	65	28	3 " 8	14.00
1	⅜ "	90	40	6 " 10	16.00
2	½ "	125	60	8 " 15	18.00
3	½ "	170	75	15 " 20	20.00
4	¾ "	250	125	20 " 30	25.00
5	¾ "	340	140	30 " 40	30.00
6	1 "	475	250	40 " 60	40.00
7	1 "	575	300	60 " 70	46.00
8	1¼ "	750	350	70 " 95	55.00
9	1¼ "	920	450	85 " 120	60.00
10	1½ "	1350	675	120 " 165	75.00
11	1½ "	1750	850	165 " 230	90.00
12	2 "	2275	1000	230 " 295	110.00
13	2 "	2820	1300	295 " 375	125.00
14	2 "	3400	1700	375 " 460	150.00
15	2½ "	3650	1800	460 " 500	175.00
16	2½ "	4000	1950	500 " 600	200.00

THE PENBERTHY INJECTOR.

STYLE LEFT AND BACK.

Suction Left, Discharge Back.

STYLE RIGHT AND LEFT.

Suction Right, Discharge Left.

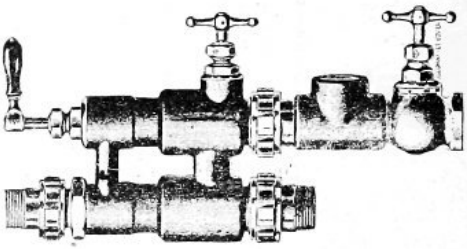
Size.	Price	Horse Power Based on Ordinary Tub. Boiler.	Horse Power Based on 30 lbs Water per H. P. per Hour.	Pipe Connection.	Capacity per Hour 1 to 5 feet lift or to 35 lbs. Steam Pressure. Maximum.	Minimum.
					Maximum.	Minimum.
O	$15.00	3 to 6	4 to 8	¼ inch.	60 Gallons.	40 Gallons.
OO	16.00	4 " 8	6 " 12	⅜ "	90 "	55 "
A	18.00	8 " 16	10 " 20	½ "	135 "	70 "
AA	20.00	12 " 22	15 " 30	½ "	180 "	100 "
B	25.00	17 " 32	22 " 45	¾ "	250 "	140 "
BB	30.00	20 " 45	25 " 60	¾ "	355 "	170 "
C	40.00	40 " 65	45 " 80	1 "	475 "	300 "
CC	45.00	45 " 80	50 " 100	1 "	600 "	350 "
D	55.00	50 " 100	60 " 135	1¼ "	800 "	425 "
DD	60.00	75 " 135	85 " 165	1¼ "	1,000 "	525 "
E	75.00	100 " 180	125 " 235	1½ "	1,400 "	800 "
EE	90.00	115 " 255	150 " 320	1½ "	1,900 "	900 "
F	110.00	160 " 320	200 " 400	2 "	2,400 "	1,300 "
FF	125.00	200 " 400	250 " 500	2 "	3,000 "	1,600 "
G	150.00	300 " 500	325 " 600	2½ "	3,600 "	2,000 "
GG	200.00	375 " 600	400 " 750	2½ "	4,200 "	2,500 "

N. B.—Where Injectors are ordered by size connections we always send the size having the larger capacity.

THE HANCOCK INSPIRATOR.

"STATIONARY" PATTERN.

FOR STATIONARY, MARINE AND PORTABLE BOILERS



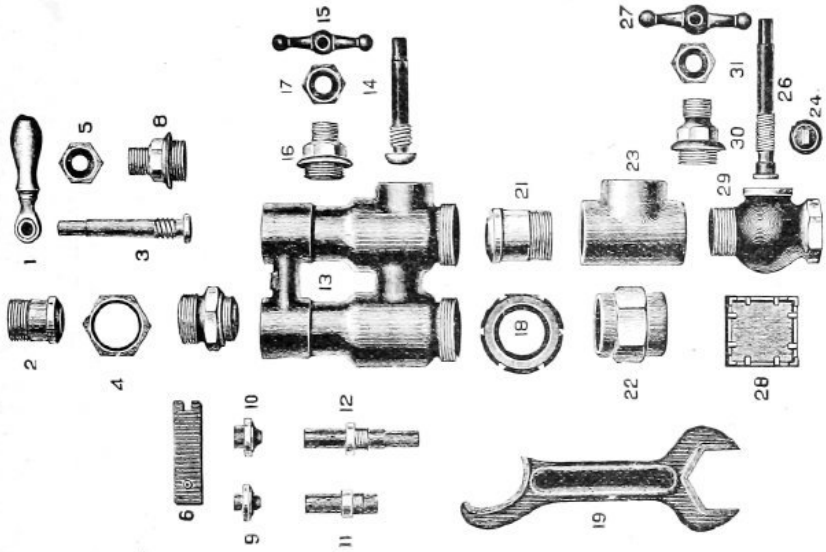
PRICES, CAPACITIES AND PIPE CONNECTIONS.

NOTE.—Capacities guaranteed to be actual as listed.

SIZES	PRICES	CAPACITIES PER HOUR.		PIPE CONNECTIONS.			
		With 60 Lbs. Steam Pressure and 4 ft Lift	Horse Power.	Steam.	Suction.	Delivery.	Overflow.
No.	$16.00	60 gallons	8	⅜	⅜	⅜	¼
" 8¼	18.00	90 "	12	⅜	½	½	⅜
" 10	20.00	120 "	16	⅜	½	½	⅜
" 12½	25.00	220 "	30	½	¾	¾	½
" 15	30.00	300 "	40	½	¾	¾	½
" 17½	40.00	420 "	56	¾	1	1	¾
" 20	45.00	540 "	72	¾	1	1	¾
" 22½	55.00	720 "	96	1	1¼	1¼	1
" 25	60.00	900 "	120	1	1¼	1¼	1
" 30	75.00	1,260 "	168	1¼	1½	1½	1¼
" 35	90.00	1,740 "	230	1¼	1½	1½	1¼
" 40	110.00	2,230 "	298	1½	2	2	1½
" 45	125.00	2,820 "	376	1½	2	2	1½
" 50	150.00	3,480 "	464	2	2½	2½	2
55	175.00	3,650 "	600	2	2½	2½	2

REPAIRS FOR THE HANCOCK INSPIRATOR.

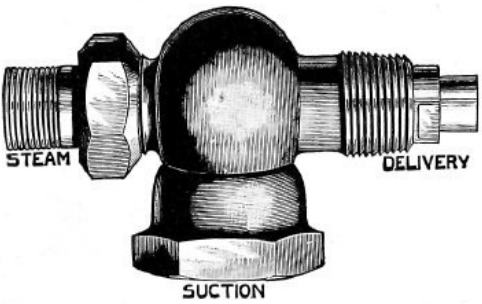
"STATIONARY" TYPE.



"BLAKESLEE" STEAM JET PUMPS.

Size, Inches.	Price, Each.	Suction Pipe, Inches.	Discharge Pipe, Inches.	Steam Pipe, Inches.	Capacity per minute, Gallons.
¾	$ 8.00	¾	1½	⅜	8
1	10.00	1	¾	½	15
1¼	12.00	1¼	1	½	20
1½	14.00	1½	1¼	¾	30
2	16.00	2	1½	¾	40
2½	20.00	2½	2	1	50
3	24.00	3	2½	1	60

AMERICAN EJECTOR.



PRICE LIST.

No.	Size of Section.	Size of Delivery.	Size of Steam Connection.	Gallons per Hour.	Price.
000	⅜ in.	⅜ in.	¼ in.	150	$ 6 00
00	½ "	⅜ "	¼ "	250	8 00
0	¾ "	½ "	⅜ "	375	9 00
1	1 "	¾ "	½ "	750	10 00
2	1¼ "	1 "	¾ "	1000	15 00
3	1½ "	1¼ "	1 "	1500	20 00
4	2 "	1½ "	1¼ "	2000	25 00
5	2½ "	2 "	1½ "	4000	35 00
6	3 "	2½ "	2 "	8000	40 00
7	4 "	3 "	2 "	11000	50 00
8	5 "	4 "	2½ "	15000	65 00
9	6 "	5 "	2½ "	45000	175 00

These Ejectors are especially adapted for lifting and forcing water from a lower level to a great height, for instance, from pits, mines or quarries, up to the surface, or to fill tanks at any great elevation above the water level.

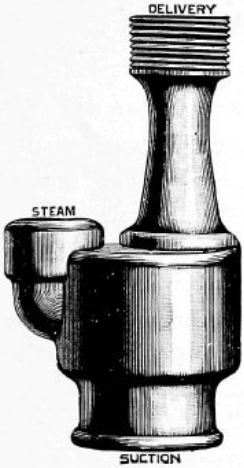
AMERICAN JET PUMPS.

PRICE LIST.

No.	Size of Section.	Size of Delivery.	Size of Steam Connection.	Gallons per Hour.	Price.
000	⅜ in.	⅜ in.	¼ in.	150	$ 4 00
00	½ "	⅜ "	¼ "	250	5 00
0	¾ "	½ "	⅜ "	375	6 00
1	1 "	¾ "	½ "	500	7 50
2	1¼ "	1 "	¾ "	1000	10 00
3	1½ "	1¼ "	1 "	1500	12 50
4	2 "	1½ "	1¼ "	2000	15 00
5	2½ "	2 "	1½ "	2800	17 50
6	3 "	2½ "	2 "	3800	25 00
7	4 "	3 "	2 "	6500	35 00
8	5 "	4 "	2½ "	10000	55 00

These Jet Pumps are for filling tanks for Farm or Road Engines; also for Drainage Pumps for Steamboats, Barges, Mines, etc., or wherever the purpose is to draw the water and discharge it above the surface level.

They are cheap, durable, reliable, compact and easily placed in position.



DRIVE WELL JET PUMP.

PRICE LIST.

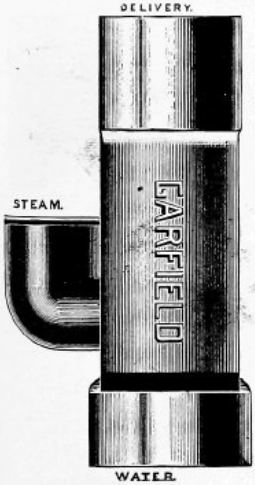
No.	Suction.	Delivery.	Steam.	Size Pipe will go in.	Gallons per hour.	Price.
1	1 in.	¾ in.	½ in.	3 in.	500	$ 7 50
2	1¼ "	1 "	¾ "	3½ "	1,000	10 00
3	1½ "	1¼ "	1 "	4 "	1,500	12 50
4	2 "	1½ "	1¼ "	5 "	2,000	15 00
5	3 "	2 "	1¼ "		3,800	25 00

This style of Jet Pump is especially intended for use in driven, drilled or bored wells, where it might be impossible to use the ordinary Jet Pump.

TANK FILLER, WITH HOSE CONNECTION.

PRICE LIST.

Size.	Suction.	Delivery.	Steam.	Gallons per hour.	Price.
1	¾ in.	¾ in.	½ in.	500	$8 00
2	1 "	¾ "	½ "	500	8 00



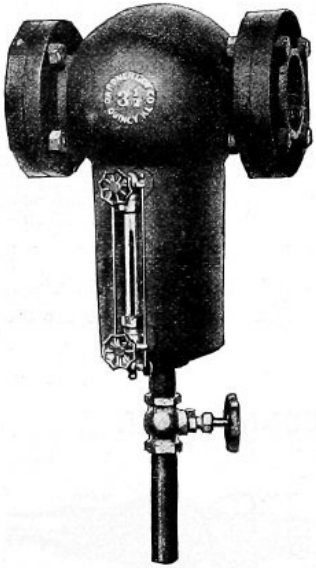
THE GARFIELD EJECTOR.

PRICE LIST AND TABLE OF CAPACITIES.

No.	Minimum Inside Diameter of Pipe in inches.			Capacity gallons per hour.	Diameter Well in inches.	Price.
	Steam.	Suction.	Delivery.			
1	⅜	¾	½	300	2¼	$ 8 00
2	⅜	1	¾	500	2¾	10 00
3	½	1¼	1	800	3	15 00
4	¾	1½	1¼	1,300	3½	20 00
5	1	2	1½	2,000	4¼	25 00
6	1¼	2½	2	3,000	5	35 00
7	1½	3	2½	5,000	6	50 00
8	1½	3	2½	6,500	6	60 00

The above capacities are secured from actual tests made on 4 foot lift and 20 foot elevation, with 60 to 80 lbs. of steam.

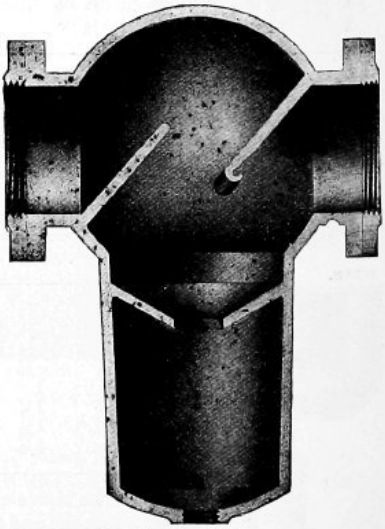
THE GARDNER STEAM SEPARATOR.



No new principle is involved in the "Gardner." It is merely the application of an old principle in a new way, so as to most efficiently accomplish results.

The interior views show clearly the methods employed, so it is unnecessary to enter into a detailed explanation here. Suffice to say that the "Gardner" possesses the following advantages:

The Horizontal Pattern.



Sectional View.

It has no condensing surfaces—it separates, not condenses.

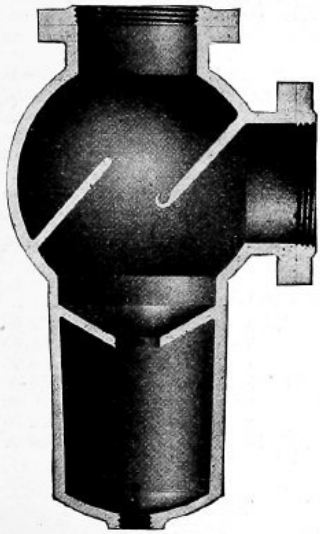
The steam passages are of greater area than the steam pipe, consequently there is no loss due to friction.

The separated water is impinged on the deflecting plates and is carried off through channels to the receiving well beneath. It cannot come in contact with incoming steam and thus be carried through.

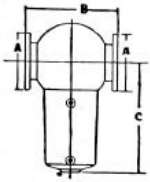
Made in a strong, substantial manner and of neat design. Every Separator thoroughly tested before shipment.

THE GARDNER STEAM SEPARATOR.

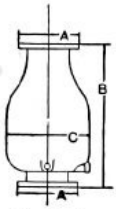
The Angle Pattern.



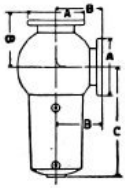
Sectional View.



Horizontal.

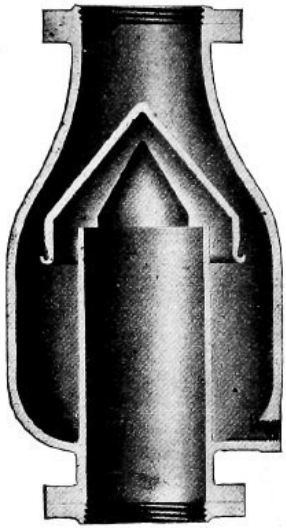


Vertical.



Angle.

The Vertical Pattern.



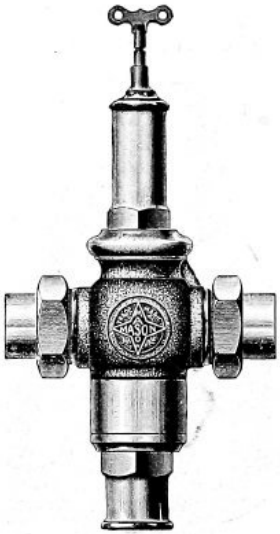
Sectional View.

Price List and Dimensions

Size	Price	Dimensions (in inches)									Size of Drain	Size of Drain of Vertical
		Vertical			Horizontal			Angle				
		A	B	C	A	B	C	A	B	C		
2	$ 40 00	6	12½	6½	6	10	12⅛	6	5	12⅛	¾	½
2½	45 00	7	14½	7	7	10	12⅛	7	5	12⅛	¾	½
3	50 00	7½	16	8	7½	12	14¼	7½	6	14¼	1	¾
3½	60 00	8½	18	8½	8½	12	14¼	8½	6	14¼	1	¾
4	70 00	9	19	9	9	14	16¼	9	7	16¼	1¼	¾
4½	75 00	9¼	19½	10½	9¼	14	16¼	9¼	7	16¼	1¼	¾
5	80 00	10	21	12½	10	15	18¼	10	7½	18¼	1½	1
6	110 00	11	25	15½	11	18	20¼	11	9	20¼	2	1
7	125 00	12½	28	16½	12½	20	21	12½	10	21	2	1
8	160 00	13½	32	18½	13	21	23	13	10½	23	2	1¼
10	220 00	16	36	20	16	24	26	16	12	26	2½	1½
12	250 00	19	40	24	19	28	31½	19	14	31½	3	1½
14	300 00	21	44	26	21	20	34	21	15	34	3	2

Prices include companion flanges and bolts, water gauges, outlet valves and connections.

THE MASON REDUCING VALVE.



This Valve is designed to reduce and maintain an even steam or air pressure, regardless of the initial pressure. It will automatically reduce boiler pressure for steam-heating coils, dry-rooms, paper-making machinery, slashers, dye-kettles, and all places where it is desirable to use lower pressure than that of the boiler.

No extra lock-up attachment is needed, as the pressure is regulated by a key, which the engineer retains. The sizes, up to and including 2 inch, are made of the best composition, and above that, of cast iron, with composition linings.

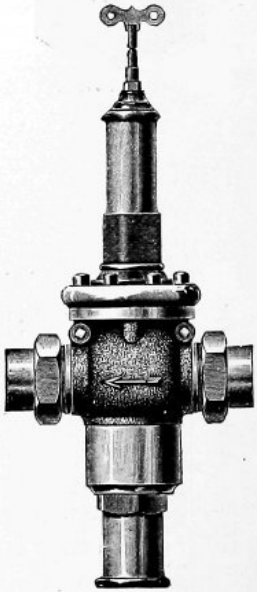
The area of the passage from the high to the low pressure side of the valve is equal, when open, to the full area of the pipe, so that a low pressure of the system, almost equal to the initial high pressure, may be carried.

To increase pressure, turn the Key in the direction taken by the hands of a watch.

PRICE LIST.

½	inch	$18 00		3	inch	$ 72 00	
¾	"	18 00		3½	"	85 00	
1	"	22 00		4	"	100 00	
1¼	"	28 00		5	"	135 00	
1½	"	35 00		6	"	180 00	
2	"	44 00		8	"	250 00	
2½	"	57 00		10	"	350 00	

MASON PUMP PRESSURE REGULATOR.



For fire, tank, elevator, air and water works pumps, or any class of pumping machinery where it is necessary to maintain a constant pressure. The regulator may be instantly adjusted to any pressure desired by simply turning the key as shown in the cut.

For automatic fire sprinkler service they have been found especially valuable, as the valve is thrown wide open immediately the slightest drop in pressure occurs.

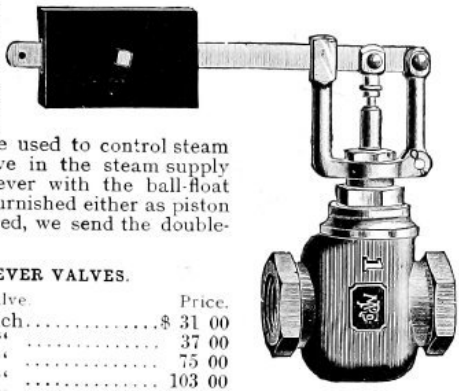
These regulators are made in all the pipe sizes; those up to and including 2 inch of the best steam metal; the largest sizes of cast iron, lined with steam metal. The springs are made of the finest tool steel, tempered.

Each size, up to and including 2 inch, is furnished with couplings.

PRICE LIST.

Size Pipe.		Price.		Size Pipe.		Price.
½	inch	$20 00		2	inch	$ 55 00
¾	"	20 00		2½	"	68 00
1	"	25 00		3	"	85 00
1¼	"	30 00		3½	"	100 00
1½	"	42 00		4	"	115 00

THE MASON LEVER VALVE.



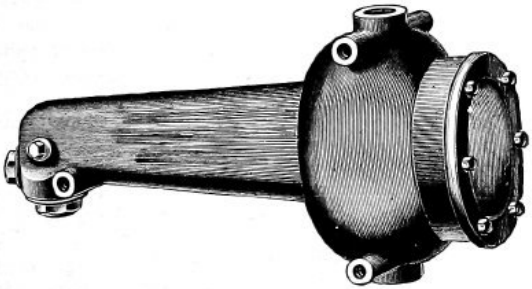
The Mason Lever Valve is a balanced valve fitted with a yoke and lever with weight attached, used in connection with a system where it is desired to govern the supply of water by means of a ball-float. This ball-float is connected to a lever valve in the supply pipe, which opens and shuts as the water rises or falls. It can also be used to control steam pumps in tank service, by placing the valve in the steam supply pipe of the pump, and connecting the lever with the ball-float placed in the tank. These valves can be furnished either as piston or seated valves. Unless otherwise ordered, we send the double-seated style.

PRICE LIST OF BALANCED AND LEVER VALVES.

Size Valve.	Price.	Size Valve.	Price.
½ inch	$ 5 50	3½ inch	$ 31 00
¾ "	6 50	4 "	37 00
1 "	8 00	5 "	75 00
1¼ "	9 00	6 "	103 00
1½ "	10 50	7 "	126 00
2 "	13 00	8 "	160 00
2½ "	19 50	10 "	200 00
3 "	25 00	12 "	286 00

Special prices on larger sizes.

THE NASON "IMMERSED VALVE" WATER FEEDER.



For Low Pressure Steam Boilers.

This Feeder has been designed for automatically controlling the water supply and maintaining the water level in boilers employed in steam heating under the low pressure conditions which universally obtain in a return or gravity system. Its valve is constantly immersed in water, which protects its seat from the destructive action of steam in the chamber, greatly increasing its durability and giving a corresponding immunity from leakage. The controlling valve is so placed that easy access to it is had by removal of a brass cap back of it and at the end of the Feeder. The steam pressure should not exceed 20 lbs., with a water pressure exceeding at all times the highest steam pressure, but with a maximum limit of 40 lbs.

Price, without Water Gauge $20 00
" with " " complete 24 00

"NASON" AND "SIDELUG" STEAM TRAPS.

Nos. 1, 2 and 3 "Nason" Trap,
For Pressures under 70 lbs.

Nos. 1, 2 and 3 "Sidelug" Trap,
For Pressures 70 to 150 lbs.

The "Nason" Steam Traps have been divided into two groups—one for standard pressures from 20 to 70 lbs., and known as the NASON STEAM TRAP. For pressures from 1 to 20 lbs. this pattern trap is also used, but with enlarged valve area, and should be specified as the NASON LOW PRESSURE TRAP. (Especially adapted for conditions found in a low pressure heating system.)

To meet modern high pressure conditions the "Sidelug" Steam Trap has been designed and patented. This Trap should invariably be ordered where the pressure is higher than 70 and not exceeding 150 lbs. Should the pressure-range vary from 150 lbs. high to 50 lbs. low the "Sidelug" Trap will give perfect results without adjustment or alteration.

Sizes No. 4 and 5 are fitted with hand-hole plate on cover, which permits easy access to the working parts without breaking the main joint.

"Nason" and "Sidelug" Steam Traps are guaranteed unconditionally for any service requiring the removal of condensation without loss of steam.

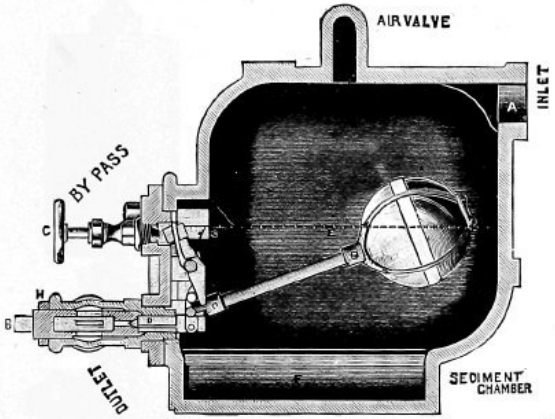
The guaranteed traps have the manufacturer's name on the cover.

Sizes, Dimensions, Capacities and List Prices.

Number of Steam Trap	1	2	3	4	5
Size of Pipe Connections, inches	¼	¾	1	1¼	1½
Diameter outside of Flanges "	10¾	14¼	15¾	19	24¼
" of Cylinder "	8	10½	12	14	18
Height to Top of Valve "	11	14	16¼	18½	23½
" " " " Cover "	8	10	12	14	15½
Maximum discharge lbs. water per minute	2	5	8	12	20
Greatest number of square feet of surface to which it should be applied	350	900	1400	2000	3500
Greatest number of lineal feet of 1 inch pipe surface to which it should be applied	1050	2700	4200	6000	10500
Weight, "Nason," lbs	40	80	113	176	336
" "Sidelug," "	47	92	125	212	343
Price, "Nason"	$16.00	20.00	27.50	42.50	70.00
" "Sidelug"	16.85	21.30	29.25	45.50	74.75

Descriptive Catalogue on application.

THE ANDERSON IMPROVED STEAM TRAP.



Made for

HIGH or

LOW

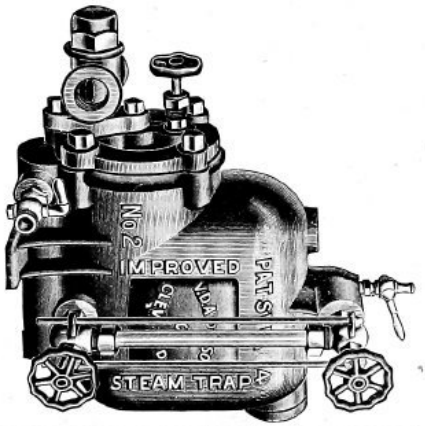
Pressure or

EXHAUST

Steam.

NOTE.—Our Standard Trap will work at any pressure, from 150 lbs. down, but for low pressure service we can furnish the Trap with extra large valve outlet; hence in ordering, indicate approximate pressure under which Trap is to be operated.

Every Trap is carefully tested under pressure before leaving our factory.

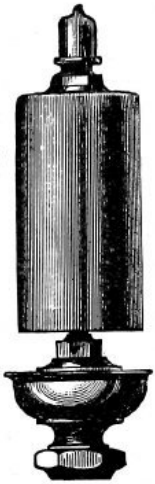


SIZES, CAPACITY, ETC.

Size number of Trap	1	2	3	4	5	6	7
Size of pipe connection, in inches	½	¾	1	1¼	1½	2	2½
Maximum discharge of condensation, per hour in lbs	750	1,200	2,000	2,800	4,000	6,000	12,000
Greatest number of square feet of surface that should be applied	500	800	1,300	2,350	3,500	5,000	10,000
Greatest number of lineal feet of 1 inch pipe surface that should be applied	1,500	2,500	4,000	7,000	10,000	15,000	30,000
Shipping weight, in lbs. (boxed)	54	67	93	112	145	190	440
Price	$20 50	22 50	28 00	35 00	50 00	70 00	120 00

STEAM WHISTLES.

BRASS.

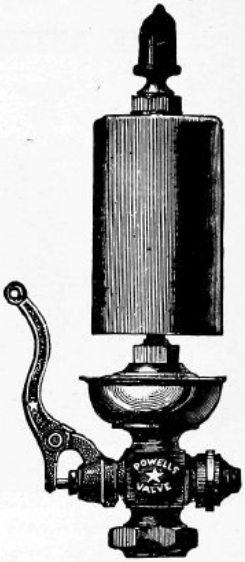


BRASS, WITHOUT VALVE.

Diameter of Bell Inches	1	1¼	1½	2
Length of Bell...Inches	2½	3	3¼	4
Size of Pipe .....Inches	¼	⅜	½	¾
Price .....Each	$2 20	2 75	3 00	4 35

Diameter of Bell..Inches	2½	3	3½	4
Length of Bell...Inches	4½	5	5¾	6½
Size of Pipe .....Inches	¾	1	1	1¼
Price.....Each	$5 25	7 25	9 50	12 00

Diameter of Bell.....Inches	5	6	8
Length of Bell .....Inches	8	9½	14
Size of Pipe .....Inches	1½	2	2½
Price .....Each	$19 00	24 00	70 00



BRASS, WITH SPRING VALVE.

Diameter of Bell .....Inches	1	1¼	1½	2	2½	3	3½	4	5	6	8
Length of Bell.....Inches	2½	3	3¼	4	4½	5	5¾	6½	8	9½	14
Size of Pipe.....Inches	¼	⅜	⅜	¾	¾	1	1	1¼	1½	2	2½
Price.....Each	$3.10	3.75	4 00	5 50	6 50	8 50	11 50	15 00	22.50	33 00	95 00

LUNKENHEIMER'S MOCKING-BIRD WHISTLE.

PATENTED.

ALL BRASS, WITH VALVE.

A simple and practical variable sound Steam Whistle. Especially adapted for traction Engines, Locomotives, Steamboats, Factory and Mill use. An excellent fire alarm. Attached like any ordinary whistle. The bell is provided with a piston, which is pulled downward by a chain running between pulleys, and when not in use is always at the top, being drawn upward by means of a spring. To CHANGE THE SOUND, PULL THE CHAIN.

The dome-shaped bell is securely supported at its base by a three-armed prong, the stem of which is adjustably screwed into the whistle base and fastened by jam-nut (E).

Owing to this construction the lower edge of the bell is always exactly in line with the slot in the base through which the steam escapes, thereby insuring best results and a perfect, clear and loud tone. The bell must be raised or lowered to suit the steam pressure by screwing same up or down, and when properly set fastened by jam-nut (E). Made of the best materials and fully warranted.

PRICE LIST.

Diameter of Bell.....Inches	2½	3	3½	4	5	6
Size of Pipe Connection.....Inches	¾	¾	1	1¼	1½	1½
All Brass, with Valve.....Each	$10.50	14.00	20.00	28.00	40.00	56.00
All Brass, without Valve.....Each	9.00	12.00	17.50	25.00	37.00	50.00
Iron Base, without Valve.....Each	.....	11.50	16.50	23.00	34.00	46.00

SINGLE-BELL CHIME STEAM WHISTLES.

WITHOUT VALVE.

FIG. 298.

WITH UPRIGHT VALVE.
(LOCOMOTIVE STYLE.)

FIG. 299.

WITH SIDE VALVE.

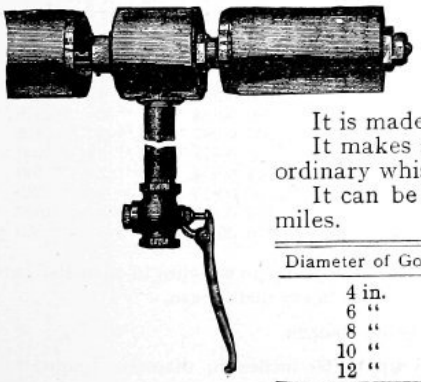
FIG. 300.

Diameter of Bell.	Size of Steam Pipe.	Fig. 298.	Fig. 299.	Fig. 300.
1½ inch.	⅜ inch.	$ 4.50	.....	$ 6.00
2 "	½ "	5.00	.....	7.00
2½ "	¾ "	7.00	.....	9.00
3 "	¾ "	8.00	.....	11.00
4 "	1 "	14.00	$18.00	18.00
5 "	1¼ "	28.00	35.00	35.00
6 "	1½ "	38.00	42.00	45.00
8 "	2 "	85.00	.....	100.00
10 "	2½ "	150.00	.....	180.00
12 "	3 "	260.00	.....	300.00

WHISTLE VALVES.

PRICE LIST

SIZE, ... inches	⅜	½	¾	1	1¼	1½	2	2½	3
Brass, ... each	2 00	2 50	3 00	3 50	5 00	6 00	9 00	13 00	27 00



ZELNICKER'S "OLD NOISY" GONG WHISTLE.

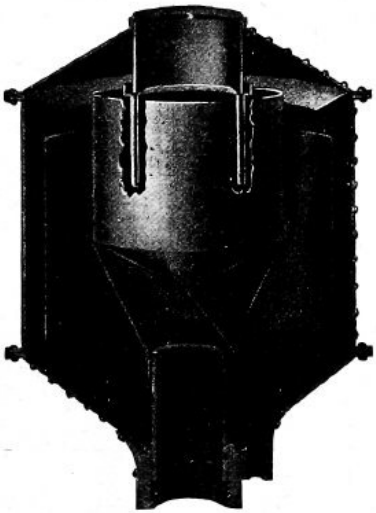
It is made all of iron and will last forever.

It makes an entirely different sound from an ordinary whistle.

It can be heard distinctly from six to eight miles.

Diameter of Gong	Size of Steam Inlet.	Price
4 in.	1¼ in.	$12 00
6 "	1½ "	14 00
8 "	2 "	20 00
10 "	2½ "	30 00
12 "	3 "	40 00

BURT EXHAUST HEAD.



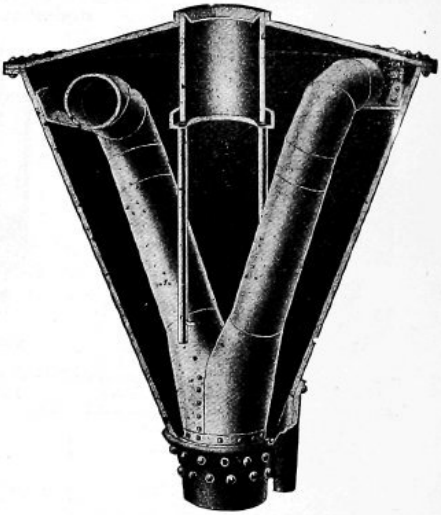
DIMENSIONS AND PRICES.

Size of Exhaust Pipe.	Price.	Height	Diam.	Size of Drip.	Shipping Weight.
1 or 1½ in.	$16 00	16 in.	10 in.	¾ in.	30 lbs.
2 " 2½ "	20 00	18 "	12 "	1 "	30 "
3 " 3½ "	24 00	20 "	14 "	1 "	50 "
4 " 4½ "	32 00	27 "	16 "	1 "	65 "
5 "	40 00	29 "	18 "	1¼ "	89 "
6 "	48 00	31 "	20 "	1¼ "	125 "
7 "	60 00	36 "	22 "	1¼ "	130 "
8 "	72 00	39 "	24 "	1½ "	152 "
9 "	84 00	43 "	26 "	1½ "	210 "
10 "	100 00	46 "	30 "	2 "	222 "
11 "	100 00	46 "	30 "	2 "	222 "
12 "	120 00	48 "	32 "	2 "	305 "
13 "	140 00	51 "	34 "	2 "	368 "
14 "	160 00	56 "	36 "	2½ "	450 "
15 "	188 00	59 "	39 "	2½ "	557 "
16 "	200 00	62 "	42 "	2½ "	650 "
17 "	216 00	69 "	45 "	3 "	708 "
18 "	240 00	76 "	48 "	3 "	840 "
19 "	264 00	79 "	50 "	3½ "	900 "
20 "	288 00	82 "	52 "	3½ "	

Sizes above 6 inches are fitted with extra heavy flanges.

Prices on heads above 20 inches and up to 60 inches in diameter quoted upon application.

STANDARD EXHAUST HEAD.



DIMENSIONS AND PRICES.

Size of Exhaust Pipe.	Price.	Hgt.	Dia.	Size of Drip.	Net Weight.
1 or 1½ in.	$12 00	21 in.	16 in.	¾ in.	16 lbs.
2 " 2½ "	15 00	27 "	21 "	1 "	20 "
3 " 3½ "	18 00	31 "	25 "	1 "	41 "
4 " 4½ "	24 00	37 "	30 "	1 "	62 "
5 "	30 00	40 "	32 "	1¼ "	70 "
6 "	36 00	43 "	35 "	1¼ "	102 "
7 "	45 00	47 "	39 "	1¼ "	127 "
8 "	48 00	50 "	42 "	1½ "	190 "
9 "	63 00	53 "	45 "	1½ "	225 "
10 "	75 00	57 "	49 "	2 "	245 "
12 "	90 00	64 "	55 "	2 "	345 "
13 "	105 00	67 "	58 "	2 "	375 "
14 "	120 00	71 "	62 "	2½ "	400 "
15 "	141 00	74 "	65 "	2½ "	460 "
16 "	150 00	77 "	69 "	2½ "	525 "
18 "	180 00	85 "	76 "	3 "	600 "
20 "	216 00	95 "	82 "	3½ "	800 "

Heads up to 6 inches in diameter have a very heavy metal base.

CHACE'S MACHINE OILERS.

WITH TIN BOTTOM.

		No. 00	0	1	2	3	4	5	6
Spun Zinc Oilers	Per dozen	$1.00	1.25	1.50	2.00	2.25	2.75	3.50	4.50
Zinc Drip Cup	"		2.00	2.25	3.00	3.25	3.75	4.50	5.50

WITH BRASS BOTTOM.

		No. 0	1	2	3	4	5	6
Spun Zinc Oilers	Per dozen	$1.50	1.75	2.50	3.00	3.50	4.50	5.50
Zinc Drip Cup	"	2.25	2.50	3.50	4.00	4.50	5.50	6.50
		No. 0	1	2	3	4	5	6
Spun Brass Oilers	Per dozen	$2.25	2.50	3.50	4.00	4.75	6.00	7.50
Brass Drip Cup	"	3.00	3.50	4.50	5.25	6.00	7.00	8.50
		No. 0	1	2	3	4	5	6
Spun Copper Oilers	Per dozen	$2.50	2.75	3.75	4.25	5.00	6.25	8.00
Copper Drip Cup	"	3.25	3.75	4.75	5.50	6.25	7.25	8.75

STAMPED TIN OILERS.

WITH TIN BOTTOM.

	No. 0	1	2	3	4
Per Dozen,	$1.25	1.50	2.00	2.25	2.75

WITH BRASS BOTTOM.

	No. 0	1	2	3	4
Per Dozen,	$1.50	1.75	2.50	3.00	3.50

BRONZED, BRASS AND COPPER PLATED STEEL OILERS.

No. 120.

FIG. 643.

No. 130.

FIG. 644.

No. 140

FIG. 645

No. 120,	Polished Brass	Oiler,	2¾	inch	diameter,	2½	inch	nozzle	Fig.	643	Per dozen,	$	6 50
" 130,	"	"	3¾	"	"	3	"	"	"	644	"		8 00
" 140,	"	"	3¾	"	"	9	"	"	"	645	"		9 20
" 140A,	"	"	3¾	"	"	3	"	"	"	645	"		10 20
" 140B	"	"	3¾	"	"	9	"	"	"	645	"		11 20
" 150,	"	"	4¼	"	"	3	"	"	"	644	"		12 00
" 160,	"	"	4¼	"	"	9	"	"	"	645	"		14 00
" 120,	Nickel Pl'd	"	2¾	"	"	2½	"	"	"	643	"		6 50
" 130,	"	"	3¾	"	"	3	"	"	"	644	"		8 00
" 130A,	"	"	3¾	"	"	5	"	"	"	644	"		8 75
" 140,	"	"	3¾	"	"	9	"	"	"	645	"		9 20
" 140A,	"	"	3¾	"	"	3	"	"	"	645	"		10 00
" 140AA,	"	"	3¾	"	"	5	"	"	"	645	"		10 75
" 140B,	"	"	3¾	"	"	9	"	"	"	645	"		11 25
" 150,	"	"	4¼	"	"	3	"	"	"	644	"		12 00
" 150A,	"	"	4¼	"	"	5	"	"	"	644	"		13 00
" 160,	"	"	4¼	"	"	9	"	"	"	645	"		14 00
" 12,	Brazed or Copper Plate St el	"	2¾	"	"	2½	"	"	"	643	"		4 50
" 13,	"	"	3¾	"	"	3	"	"	"	644	"		5 50
" 13A,	"	"	3¾	"	"	5	"	"	"	644	"		6 00
" 14,	"	"	3¾	"	"	9	"	"	"	645	"		6 50
" 14A,	"	"	3¾	"	"	3	"	"	"	645	"		7 50
" 14AA,	"	"	3¾	"	"	5	"	"	"	645	"		8 00
" 14B,	"	"	3¾	"	"	9	"	"	"	645	"		8 50
" 15,	"	"	4¼	"	"	3	"	"	"	644	"		9 25
" 15A,	"	"	4¼	"	"	5	"	"	"	644	"		9 75
" 16.	"	"	4¼	"	"	9	"	"	"	645	"		10 50

OILERS.

THE "CANNON OILER."

No. 0.	½ Pint, Tin,	6 inch Spout.	Fig. 646	Per dozen,	$7.00
" 1.	1 " "	8 " " "	646	"	8.00
" 2.	1½ " "	12 " " "	646	"	9.00
" 3.	1 Quart, "	20 " " "	646	"	10.00
" 00.	½ Pint, Brass,	6 inch Spout.	" 646	"	12.00
" 01.	1 " "	8 " " "	646	"	14.00
" 02.	1½ " "	12 " " "	646	"	16.00
" 03.	1 Quart, "	20 " " "	646	"	18.00

For extra length Spouts add 2½ cents per inch.

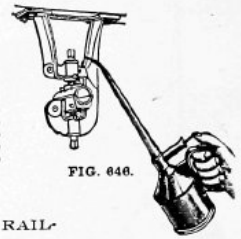


FIG. 646.

BRASS AND COPPER-PLATED STEEL RAILROAD OILER.

No. 17. 1 Pint, Brass, 3⅛ inch diameter, 5 inch high, 12 inch Nozzle. Fig. 648 ..... Per dozen, $18.00

No. 18. 1 Quart, Brass, 4⅛ inch diameter, 6 inch high, 18 inch Nozzle. Fig. 648 ..... Per dozen, 21.00

No. 18A. 2 Quart, Brass, 5 inch diameter, 8 inch high, 10 or 14 inch Nozzle. Fig. 648 ..... Per dozen, 24.00

No. 10. 1 Pint, Steel, 3⅛ inch diameter, 5 inch high, 12 inch Nozzle. Fig. 648 ..... Per dozen, 14.00

No. 11. 1 Quart, Steel, 4⅛ inch diameter, 6 inch high, 18 inch Nozzle. Fig. 648 ..... Per dozen, 18.00

No. 11A. 2 Quart, Steel, 5 inch diameter, 8 inch high, 9 or 14 inch Nozzle. Fig. 648 ..... Per dozen, 24.00

FIG. 646.

IMPROVED STANDARD BRONZED STEEL AND COPPER-PLATED RAILROAD OILER.

No. 100. 1 Pint, Steel, 3⅜ inch diameter, 6¼ inch high, 12 inch Nozzle. Fig. 649 ..... Per dozen, $14.00

No. 101. 1 Quart, Steel, 4⅛ inch diameter, 6 inch high, 12 inch Nozzle. Fig. 649 ..... Per dozen, 18.00

No. 111. 2 Quart, Steel, 5 inch diameter, 8 inch high, 10 or 14 inch Nozzle. Fig. 649 ..... Per dozen. 20.00

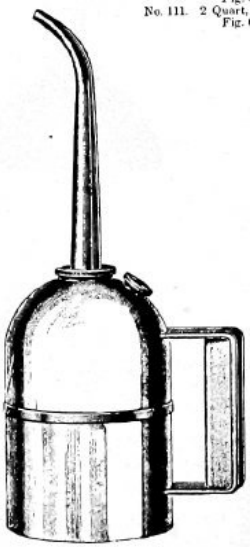


FIG. 649.

FIG. 647.

GEM OILER.

			Steel.	Brass.
Fig. 647.	½ Pint, 4 inch.	Straight Spout	$6.00	$9.00
" 647.	½ Pint, 6 inch.	Straight or Curved Spout	6.50	9.50
" 647.	½ Pint, 9 inch.	Straight or Curved Spout	7.00	10.00
" 647.	1 Pint, 4 inch.	Straight Spout	8.00	11.00
" 647.	1 Pint, 6 inch.	Straight or Curved Spout	8.50	11.50
" 647.	1 Pint, 9 inch.	Straight or Curved Spout	9.00	12.50

NOTE—6 and 9 inch Spouts furnished curved unless otherwise ordered.

FIG. 648.

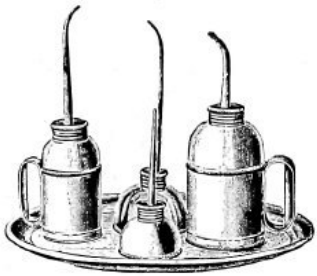
INSPECTORS' AND LOCOMOTIVE TORCHES.

BRONZED AND COPPER-PLATED STEEL.

No. 26. 2 inch diameter, 15 inch high, Brass Cap and Tube ..... Per dozen, $12 00

No. 27. 4½ inch diameter, 4½ inch high, Brass Cap and Tube ..... Per dozen, $12 00
No. 28. 5½ inch diameter, 4½ inch high Brass Cap and Tube ..... Per dozen, 15 00

ENGINEERS' SETS, BRASS AND TIN.



3 Pieces and Tray, Brass, $6.00. 5 Pieces and Tray, Brass, $9.00 5 Pieces and Tray, Tin, $3.00.

ENGINEERS' SETS.

WITH ROUND TRAY.

FIG. 666.

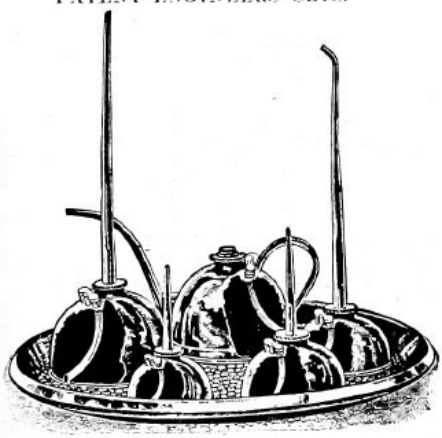
	WITH ROUND TRAY.	Per dozen
No. 30.	Five Pieces of Brass (including Tray)	$ 6 00
" 40.	Six " " " "	9 00
" 50.	Five " of Nickel, " "	8 00
" 60.	Six " " " "	11 00

	WITH ROUND TRAY.	Per dozen
No. 30.	Five Pieces, Copper Plated (including Tray)	$5 00
" 40.	Six " " " "	7 00
" 50.	Five " Nickel " "	7 00
" 60.	Six " " " "	10 00

	WITH OVAL TRAY.	Per dozen.
No. 35.	Five Pieces, Copper, Plated (including Tray)	$7 00
" 45.	Six " " " "	10 00
" 55.	Five " Nickel " "	8 00
" 65.	Six " " " "	11 00

	PATENT ENGINEERS' SETS.	
No. 030.	Five Pieces of Brass ..... Per dozen,	$ 7 00
" 040.	Six Pieces of Brass ..... "	10 00
" 050.	Five Pieces of Nickel ..... "	9 00
" 060.	Six Pieces of Nickel ..... "	12 00

PATENT ENGINEERS' SETS.



OILERS AND LAMPS.

LOCOMOTIVE OILER.

	Tin.	Brass.
Locomotive, 1½ pint	$ 7 50	$16 00
Locomotive, 3 pint	10 00	20 00

IMPROVED PUMP OILER.

No. 205. Steel Pump Oiler, Quart . . . . Per dozen, $60 00
" 206. Brass Pump Oiler, Quart . . . " 66 00

BRONZED, COPPER AND NICKEL PLATED TALLOW POTS.

No. 212. 1 Quart, 5 inch diameter, 5 inch high, bronzed . . . . . Per dozen, $21 00
No. 213. 2 Quart, 6 inch diameter, 6 inch high, bronzed . . . . . Per dozen, 25 00
No. 212. 1 Quart, 5 inch diameter, 5 inch high, copper . . . . . Per dozen, 21 00
No. 213. 2 Quart, 6 inch diameter, 6 inch high, copper . . . . . Per dozen, 25 00
No. 214. 1 Quart, 5 inch diameter, 5 inch high, nickel plated . . . . . Per dozen, 32 00
No. 215. 2 Quart, 6 inch diameter, 6 inch high, nickel plated . . . . . Per dozen, 36 00

ENGINEERS' HAND LAMP.

FIG. 660.

STEEL JACKET LAMPS.

FIG. 661.

FIG. 660.	Tin.	Brass.
Double Tube Burner . . . . . Per dozen,	$3 75	$6 50

FIG. 661.	
No. 20. 3⅜ inch diameter . . . . . Per dozen,	$ 6 00
" 20½. 3⅜ " " . . . . . "	9 00
" 21. 4½ " " . . . . . "	12 00

Nos. 20½ and 21 can be used with either round torch wick or the flat wick burner for use with a chimney.

BRASS ALCOHOL LAMPS.

No. 25. Polished Brass, 3⅜ inch diam. . Per dozen, $ 7 50
" 25. Nickel Plated, 3⅜ inch diam. . " 10 00

IRONSIDES IMPROVED TORMAY OILER.

½ gallon.

Primarily constructed for the oiling of Mine Car Wheels, its benefits have been so pronounced as to cause its adoption for a wide range of applications in operating departments, among which may be cited—Rolling Mills, General Machinery, Locomotives, Stationary Engines, Motors, Hoisting Drums, Shafting, Sheaves, Guides, Slope Rollers, Steam Cars, Street Cars, and in fact all places where ordinary oil cans are applicable. No Mining, Manufacturing, or other Industrial Institution can afford to be without this Oil Saver.

¾ gallon.

SIZE—Half (½) Gallon.

DISCHARGE:—$\frac{1}{20}$ oz. to 1¼ oz. each operation, dependent upon adjustment, speed of operation and consistency of oil.

NOZZLE:—12 in. long, curved.

WEIGHT:—Boxed for shipment, 7 lbs.

List price.....each, $6 50

SIZE:—Three-Quarter (¾) Gallon.

DISCHARGE:—$\frac{1}{20}$ oz. to 1¼ oz. each operation, dependent upon adjustment, speed of operation, and consistency of oil.

NOZZLE:—5 in. long, curved.

Most Popular Oiler for Mine Car Wheels.

WEIGHT:—Boxed for shipment, 9 lbs.

List price.....each, $7 00

1 gallon.

SIZE—One (1) Gal.

DISCHARGE:—$\frac{1}{20}$ oz. to 1¼ oz. each operation, dependent upon adjustment, speed of operation, and consistency of oil.

NOZZLE:—5 in. long, curved.

WEIGHT—Boxed for shipment, 10 lbs.

List price...each, $8 50

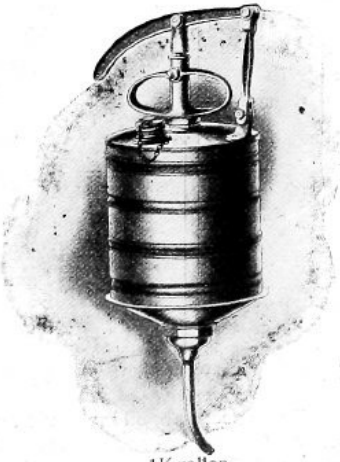
SIZE—One and One-half (1½) Gals.

DISCHARGE:—¾ oz. to 3½ oz. each operation, dependent upon adjustment, speed of operation, and consistency of oil. Successive operations give total desired.

NOZZLE:—5 in. long, curved.

WEIGHT:—Boxed for shipment, 13 lbs.

List price..each, $10 00



1½ gallon.

HEAVY BRAZED STEEL SPECIALTIES.

PYRAMID FILLER.

1 pint	per doz.,	$ 9 00
1 quart	"	10 00
2 "	"	12 00
3 "	"	14 00
4 "	"	18 00
With Strainers, extra	"	2 50

TALLOW POTS.

1 quart	per doz.,	$13 00
1½ "	"	14 00
2 "	"	15 00
3 "	"	17 00
4 "	"	18 00
With Strainers, extra	"	2 50

GREASE BUCKETS.

	Each, Top set in.	Each, without Top.
2 gallon	$2 50	$2 00
3 "	3 00	2 50
4 "	3 50	3 00
5 "	4 00	3 50

OIL CARRIER.

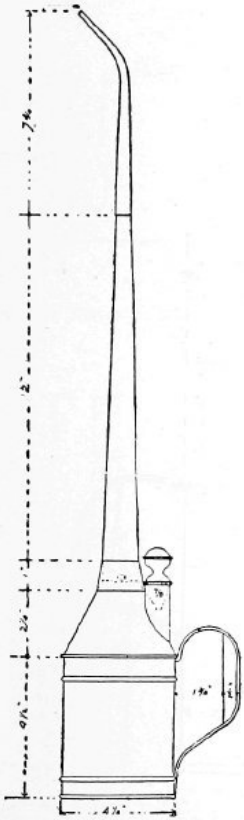
	Each.
1 gallon	$2 00
2 "	2 50
3 "	3 00
4 "	3 50
5 "	4 00

PYRAMID TORCHES.

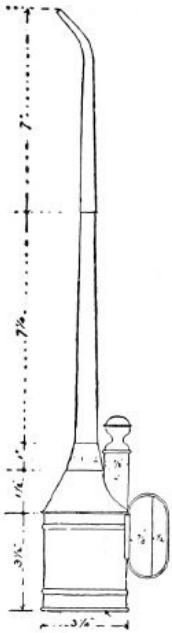
	Per doz.
½ pint, 1 burner	$ 7 00
1 " 1 "	9 00
1 quart, 1 "	10 00
1 " 2 "	11 00
2 " 1 "	12 00
2 " 2 "	13 00
4 " 2 "	15 00
4 " 3 or 4 burner	18 00
With Strainer, extra	25

These goods are all made of heavy steel, seams are all brazed with hard spelter, and they are calculated to withstand the roughest usage.

OILERS.

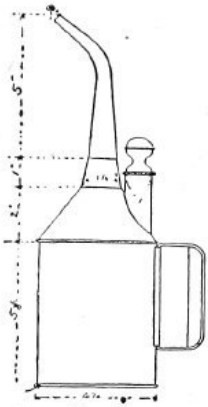


No. 3.
Quart, Long Spout.

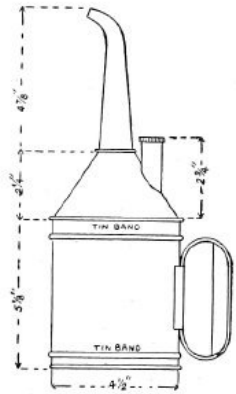


No. 4.
Pint, Long Spout.

Sizes: 1, 2 and 3 Pints.



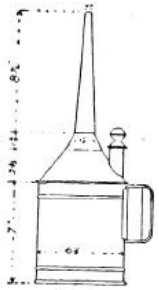
No. 6.
Quart, Short Spout.



No. 7.
Quart, Short Spout.

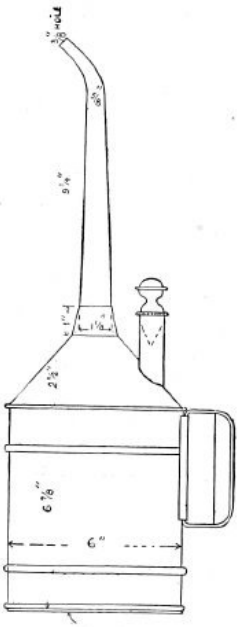
No. 3. IXXX charcoal tin, wire incased bottom. Patented filler cap with brass screw.
No. 4. IXXX " " " " " " " " " " " "
No. 6. IXXX " " " " " " " " " " " "
No. 7. IXXX " " " " " " " " " " " "

OILERS.



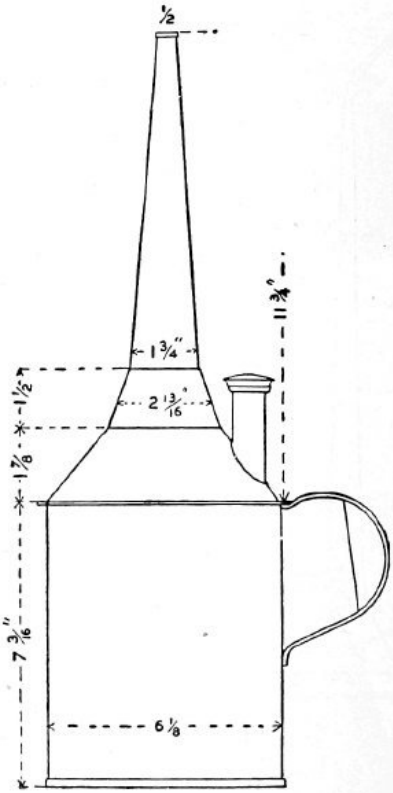
No. 8.

1 gallon, Inspectors' Can.



No. 9.

1 gallon, Car Oilers.



No. 10.

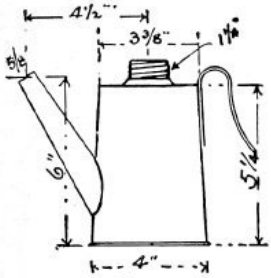
1 gallon, Car Inspectors' Oiler.

No. 8. IXXX charcoal tin or 24 gauge galvanized iron, double seamed or wire incased bottom. Patented filler cap.

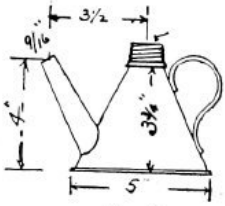
No. 9. IXXX charcoal tin or 24 gauge galvanized iron, double seamed or wire incased bottom. Patented filler cap, bent spout.

No. 10. IXXX charcoal tin or 24 gauge galvanized iron, double seamed or wire incased bottom. Brass can screw.

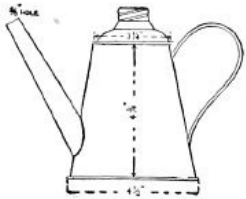
TORCHES.



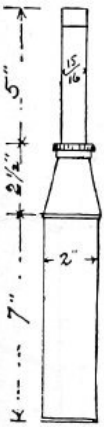
No. 12.
1 quart, Tunnel or Miners' Torch.



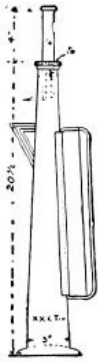
No. 13.
Hand or Shop Torch.



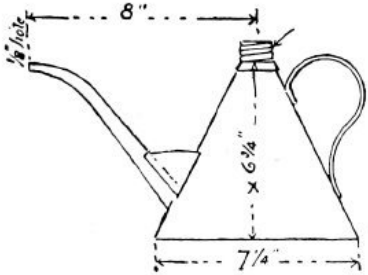
No. 14.
Hand, Shop or Wipers' Torch.



No. 15.
Engineers' Torch.



No. 16.
Car Inspectors' Torch.



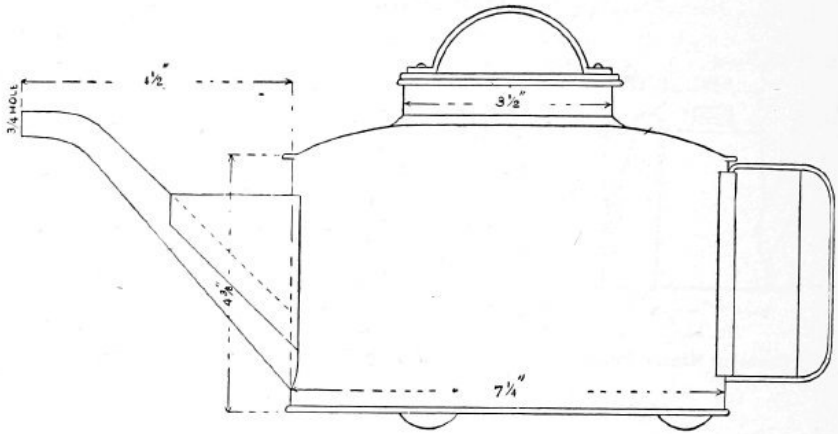
No. 17.
Lamp Filler.

No. 12. IXXX charcoal tin, seamed bottom.
No. 13. " " " " "
No. 14. " " " " "

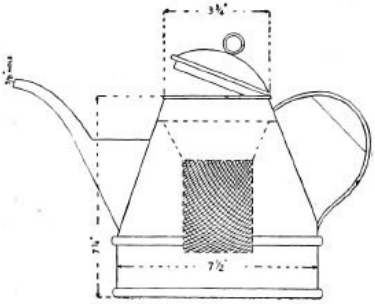
No. 15. IXXX charcoal tin, 24 gauge galvanized iron or copper, with heavy brass screw to disconnect spout.

No. 16. IXXX charcoal tin, heavy brass screw to disconnect spout. Bottom filled with lead so it cannot be easily upset.

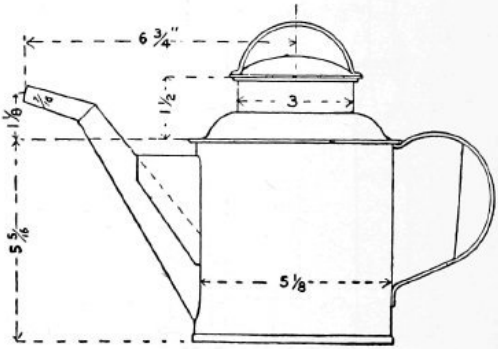
No. 17. IXXX charcoal tin, seamed bottom.



No. 21. Oval Tallow Pot.



No. 22.
Oval Tallow Pot.
Dimensions of Oval 4½x7½ inches.



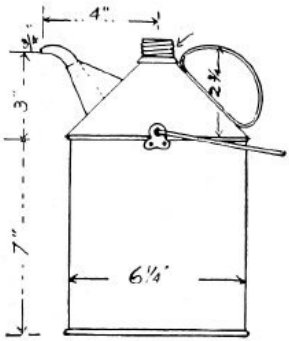
No. 23.
Round Tallow Pot.

No. 21. IXXX charcoal tin, wired bottom. Strainer over bottom of spout.

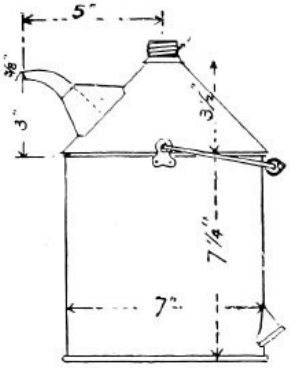
No. 22. IXXX " " wire incased bottom, hinged lid. Removable strainer made of wire gauze or perforated tin as ordered.

No. 23. IXXX charcoal tin, wired or double seamed bottom. Strainer over bottom of spout.

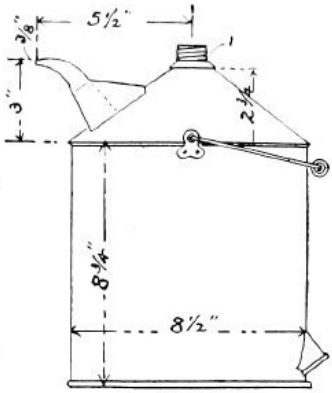
OIL CANS.



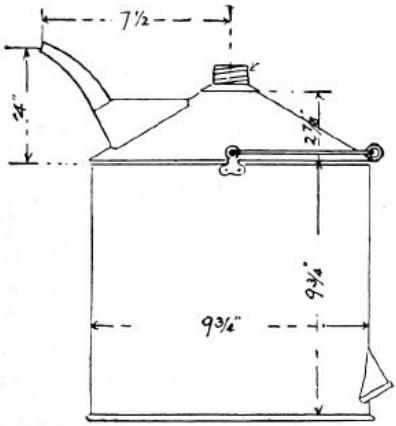
No. 28.
1 gallon, Oil Can.



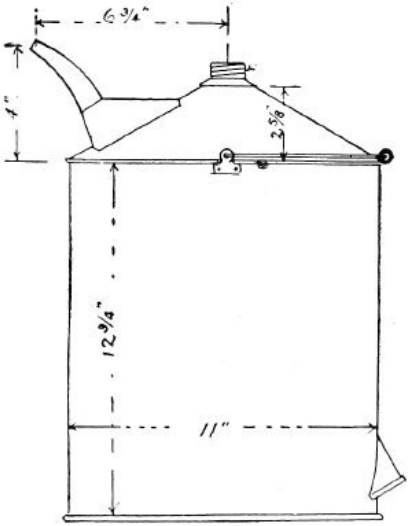
No. 29.
1½ gallon, Oil Can.



No. 30.
2 gallon, Oil Can.



No. 31.
3 gallon, Oil Can.



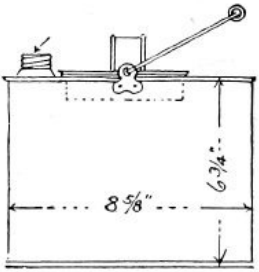
No. 32.
5 gallon, Oil Can.

No. 28. IXXX charcoal tin or 24 gauge galvanized iron, wire incased or double seamed bottom with No. 12 tinned wire soldered around edge to protect same.

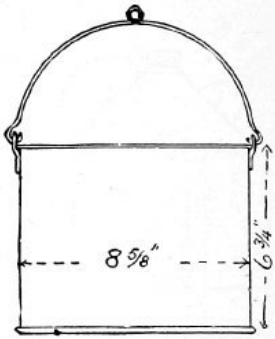
Nos. 29, 30 and 31 are made of the same material.

No. 32. IXXX charcoal tin or 24 gauge galvanized iron, wire incased or double seamed bottom with No. 12 tinned wire soldered around edge to protect same. Also made with heavy galvanized iron band at bottom.

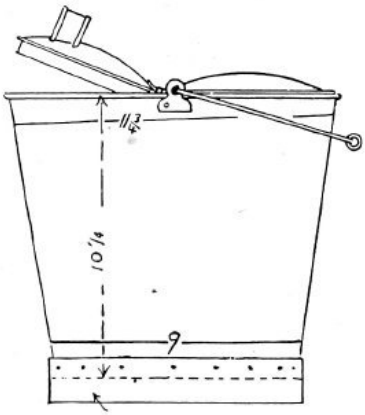
BUCKETS.



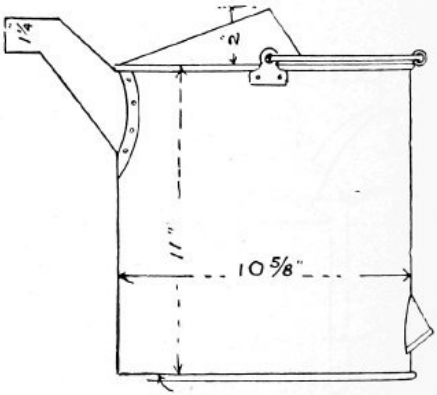
No. 35.
Round Tallow Bucket.



No. 36.
Paint Bucket.



No. 37.
Dope Bucket.



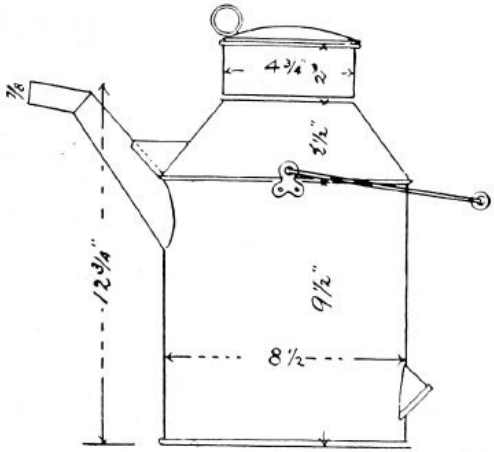
No. 41.
Water Bucket.

No. 35. IXXX charcoal tin or 26 gauge galvanized iron, double seamed bottom, covered top with lid and can screw.

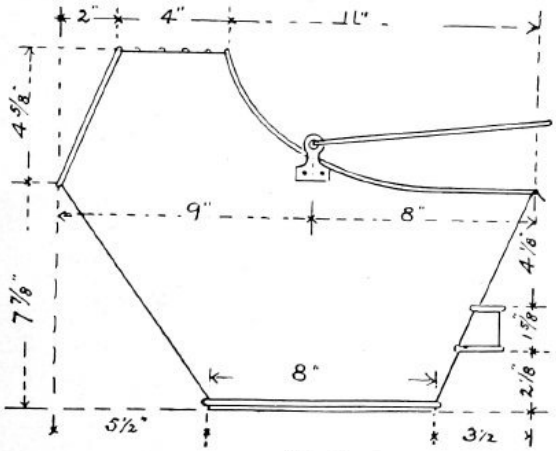
No. 36. Galvanized iron or tin, double seamed bottom.

No. 37. 24 gauge galvanized iron, double seamed bottom with 18 gauge galvanized iron band riveted around bottom.
Covered top with hinged lid.

No. 41. Same material as No. 40, with riveted spout and hood over top.



No. 45.
Round Water Can.



No. 47.
Sand Bucket.

No. 45. 26 gauge galvanized iron, IXXX charcoal tin top and spout, hinged lid.
No. 47. 22 " " " double seamed bottom.

OIL TANKS.

Made of sheet steel. Galvanized inside and outside. Outside japanned in bright colors. To give greater strength, the sides and bottoms are corrugated. The bottoms are deeply deflected and reinforced by a band of iron.

The pumps are strong and effective and can be detached and used for pumping from the barrel into the tank.

Each tank is provided with measures and funnels.

Gallons	30	60	100
Price.....Each	$6.00	7.00	12 50

GALVANIZED STEEL WASTE CANS.

A thoroughly fire-proof can. Adopted by insurance underwriters in fourteen large cities. Cover self-closing; has a heavy forged rim and closes by its weight. Legs are malleable iron. The only can with proper floor protection. No springs, no repairs; will last a lifetime. Nicely japanned in maroon. Waste can be fired in this can without danger.

No. 410. 12 in. long. 12 in. wide, 30 in. deep.....Each $4.50
No. 412. 16 in. long, 16 in. wide, 36 in. deep.....Each 8.50

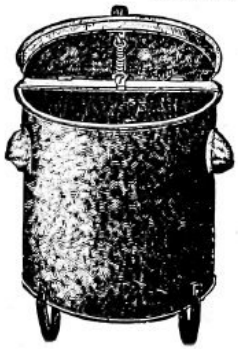
TIN, WOOD JACKET.

TIN, WOOD JACKET.

Capacity.....Gallons	1	2	3	5	10
Tin, Wood Jacket.....	$0.30	.40	.45	.70	.90
Tin, Wood Jacket, with spout.....	.40	.45	.50	.75	.95

GALVANIZED OIL WASTE CANS.

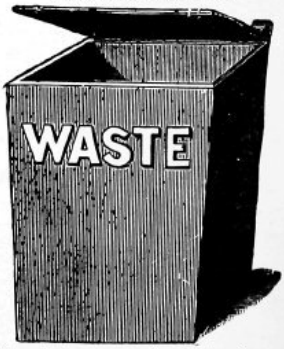
SELF-CLOSING LIDS.



No.	Size, Inches.	Per Doz.
1	11¼ x 15	$16.00
2	12 x 18	22 00
3	13 x 20	28.00
4	14 x 22	34.00
5	16 x 24	40 00
6	18 x 24	78 00

CAST IRON WASTE BOXES.

SELF-CLOSING LID.



Size, 7 in. square by 8¼ in. deep.
Price.....each, $1 75

ZELNICKER CYLINDER OIL.

This is the highest grade cylinder oil compounded. We guarantee it to give better results than any high grade oil on the market.
Price.....per gallon, $0 50

"W. A. Z." CYLINDER OIL.

This is a high grade cylinder oil, and is far better quality than average plants buy. We will guarantee it to give far better service than any 35 to 40 cent cylinder oil on the market.
Price.....per gallon, $0 30

No. 3. CYLINDER OIL.

Those who use cylinder oil costing from 32 to 35 cents per gallon, try this oil.
Price.....per gallon, $0 30

ZELNICKER ENGINE OIL.

This is the highest grade engine oil our refinery can produce. It is light in body but great in lubricating quality, it reaches the spot quickly and will feed in any cup.
Price.....per gallon, $0 25

"W. A. Z." ENGINE OIL.

This oil has the body, but does not gum, will run freely 15 degrees above zero.
Price.....per gallon, $0 20

We can also quote you on Winter Black Oil, Summer Black Oil, Black Car Oil, Black Shaft Line Oil, Lard Oil, Linseed Oil, Crank Case Oil, Westinghouse Engine Oil, etc.

THE WILEY PATENT SAFETY OIL CABINETS.

BEVEL TOP CABINETS.

A 60 GALLON CABINET.

Price List and Sizes of Cabinets (Complete)

Gallons.	Net Price.	Number of Compartments.		Size in Inches.
25	$20.00		41 inches high,	20x22
60	25.00	One	for One Barrel,	22x31
110	35.00	One	for Two Barrels,	25x41
120	45.00	Two	for Two Barrels,	25x49
160	40.00	One	for Three Barrels,	28x53
170	50.00	Two	for Three Barrels,	28x57
180	60.00	Three	for Three Barrels,	28x71
210	45.00	One	for Four Barrels,	34x55
220	55.00	Two	for Four Barrels,	34x60
260	50.00	One	for Five Barrels,	34x69
270	60.00	Two	for Five Barrels,	34x71
300	90.00	Five	for Five Barrels,	36x82

FLAT TOP CABINETS.

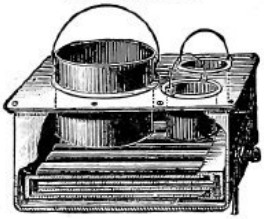
A 60 GALLON FLAT TOP CABINET.

Price List and Sizes of Cabinets Complete.

Gallons.	Net Price.	Number of Compartments.		Size in Inches.
25	$20 00	One	32 inches high,	22x22
60	25.00	One	for One Barrel,	26x38
110	35.00	One	for Two Barrels,	26x47
120	45.00	Two	for Two Barrels,	26x52
160	40.00	One	for Three Barrels,	26x66
170	50.00	Two	for Three Barrels,	28x64
180	60.00	Three	for Three Barrels,	28x76
210	45.00	One	for Four Barrels,	30x73
220	55.00	Two	for Four Barrels,	30x77
260	50.00	One	for Five Barrels,	30x89
270	60.00	Two	for Five Barrels,	30x94
300	90.00	Five	for Five Barrels,	80x100

GLUE HEATERS

Nos. 1, 2 and 3



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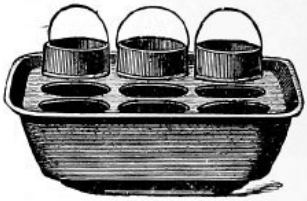

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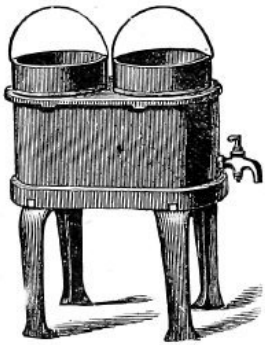

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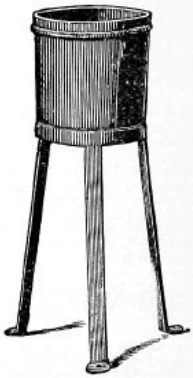


Steam Glue Heaters, Nos. 1, 2 and 3

No. 1, With Holes for Two 5-Inch, or One 8-Inch, or One 9-Inch Pot .	10.00
" 2, " " " Six 5 " " " 10 " and Two 5 " Pots.	16.00
" 3, " " " Two 12 " " " 12 " " Four 5 " " .	20.00
" 3, " " " Eight 5 " " " 10 " " " 6 " " .	20.00

Pots are not included in price of Heaters. Prices quoted on any combination of Pots desired.

Copper Pots for Nos. 1, 2 and 3 Heaters

Diameter.....inches	5	6	7	8	9	10	12
Depth.....inches	5	5¼	7	6¾	7½	8	8
Price.....each	2.00	2.25	2.50	3.50	4.00	[illegible]	[illegible]50

Steam Jacketed Glue Heaters, Nos. 5, 6 and 7 Tested to 150 Pounds per [illegible]

Price of Heaters do not include Pots for Nos. 5 and 6 nor Stands for No[illegible]

Number.....	5	6	6	7	8	9
Number of Pots.....	2	5	9	1	1	1
Diameter of Pots.....inches	7	7	5	8½	6	8
Depth " " ..... "	6	6	6	7	6	3
Price of Heaters Only.....each	6.25	13.00	13.00	5.00	4.00	4.50
" " Pots, Cast Iron..... "	1.00	1.00	.75	....	....	....

Cast Iron Stands for No. 5 Heater, 2.60 each. Wrought Iron Stands for No. 7 Heater, 3.50 each.

No. 23.

No. 23. ELECTRIC "HOT BLAST" BLOW TORCH.

FOR GASOLINE.

Height, 8 inches; weight, 2 lbs.; diameter, 3½ inches; capacity, 1 pint gasoline; burns in any position; shipping weight, 4⅔ lbs.; consumes ¼ pint per hour. *Always use 74° gasoline for operating all our goods.* Generates a heat of 1,500°.

Price.....each, $4 50

No. 10. JEWEL COMBINATION.

Height, 9¼ inches. All other dimensions the same as No. 23. Complete with soldering iron attachment.

Price.....each, $5 00

No. 22. IMPERIAL "HOT BLAST" BLOW TORCH.

Height over all, 9 inches; weight, 3 lbs.; diameter, 4½ inches; capacity, 1 quart; consumption, ½ pint per hour; shipping weight, 5½ lbs.; generates a heat of 1,500°.

Price.....each, $5 00

No. 22.

No. 28. CRESCENT COMBINATION.

Height, 10½ inches; weight, 3 lbs.; diameter, 4½ inches; capacity, 1 quart; shipping weight, 5½ lbs.; consumption, ½ pint per hour; generates a heat of 1,500°.

Price.....each, $5 50

No. 29.

No. 29. KING COMBINATION "HOT BLAST" TORCH.

Height to top of burner, 11 inches; weight, 4 lbs.; capacity, 1 quart; consumption of oil, ½ pint per hour at full blast; diameter, 4½ inches; shipping weight, 6 lbs.; generates a heat of 2,000°.

Price.....each, $6 00

No. 30. KING "HOT BLAST."

Height to top of burner, 10 inches; weight, 4 lbs.; capacity, 1 quart; consumption of oil, ½ pint per hour at full blast; diameter, 4½ inches; shipping weight, 5½ lbs.; generates a heat of 2,000°.

Price.....each, $5 50

No. 21.

No. 21. COMBINATION "HOT BLAST" BLOW TORCH.

FOR GASOLINE.

Height, 10 inches; weight, 4 lbs.; capacity, 1 quart; diameter, 4½ inches; consumes ½ pint per hour; shipping weight, 6½ lbs.; produces about 2,000° Fahrenheit.

Price.....each, $7 00

No. 58

No. 20. BRAZER'S "HOT BLAST" BLOW TORCH.

FOR GASOLINE.

Height, 9 inches; weight, 4½ lbs.; diameter, 4½ inches; capacity, 1 quart; shipping weight, 6¾ lbs.; produces about 2,000° Fahrenheit.

Price.....each, $7 20

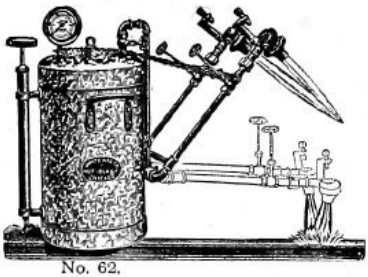
No. 20.

No. 58. "GEM" POCKET TORCH.

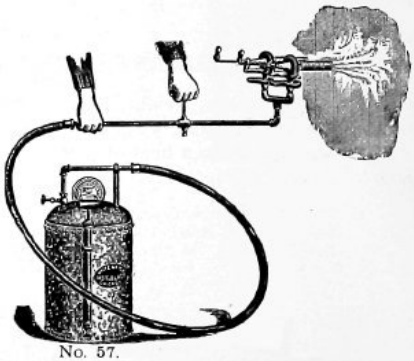
FOR ALCOHOL.

Height, 4½ inches; shipping weight, 1 lb.; diameter, 1¾ inches; capacity, ¼ pint.

Price.....each, $2 50



No. 62.



No. 57.

No. 62. RAILWAY JOINT HEATER.

FOR GASOLINE.

Height, 28 inches; weight, 75 lbs.; capacity, 10 gallons; shipping weight, 100 lbs.; consumption of oil, about ½ gallon per hour.

Price, including a torch for heating burners.....each, $72 00

No. 57. RAILWAY PAINT BURNER.

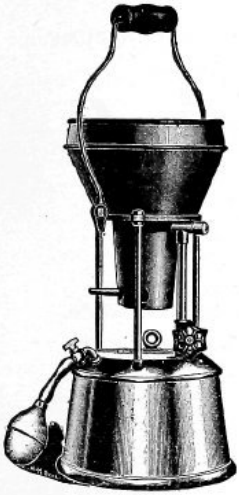
FOR GASOLINE OR KEROSENE.

Weight, 65 lbs.; diameter, 14 inches; working pressure, 25 to 50 lbs.; height, 18 inches; capacity, 10 gallons; consumes ½ gallon per hour; shipping weight, 85 lbs.

Price of Paint Burner, without hose, gasoline.....$48 00

" " " " " kerosene..... 56 00

" " Special Oil Hose.....per foot, 75



No. 42.

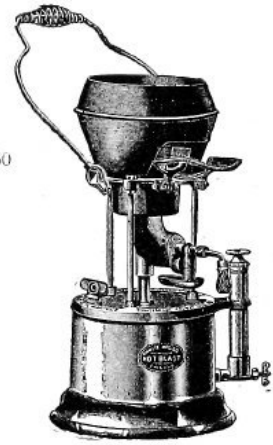
No. 42. PIONEER "HOT BLAST" COIL PLUMBERS' FURNACE.

Height, 17¾ inches.
Weight, 9½ lbs.
Shipping weight, 16 lbs.
Capacity, 1 gallon.

Pioneer Furnace, complete.....$6 00

No. 75. PIONEER.

Same as No. 42, with pump in tank.....$6 50



No. 31.

No. 31. COMBINATION "HOT BLAST" FURNACE.

Height, 16 inches.
Weight, 9½ lbs.
Shipping weight, 22 lbs.
Capacity, 1 gallon.

Price.....each, $11 00

No. 39.

No. 39. BONANZA "HOT BLAST" FURNACE.

Height, 11 inches.
Weight, 8 lbs.
Capacity, 1 gallon.
Consumes ¼ pint per hour.
Diameter of tank, 7½ inches.
Shipping weight, 12 lbs.

Price.....each, $9 00

PUMPS.

PITCHER SPOUT PUMP.

No.	Size Cyl.	Fitted for.	Stroke.	Iron. Price.	Brass-lined Cylinder Price.	Brass Cyl. Price.
1	2½ inch.	1 in. Pipe.	4 inch.	$ 4 25	$ 6 50	$ 7 00
2	3 "	1¼ " "	4 "	4 75	7 25	10 00
3	3½ "	1¼ " "	4 "	5 26	8 00	12 00
4	4 "	1¼ " "	4½ "	6 25	9 00	14 00
5	4½ "	2 " "	5 "	9 50	12 50	.....
6	5 "	2½ " "	5½ "	17 00	22 00	.....

REVOLVING TOP CISTERN PUMP.

No.	Size Cyl.	†Fitted for.	Stroke.	Iron. Price.	Brass Cyl. Price.	*Brass Price.
0	2 inch.	1 in. Pipe.	6 inch.	$4 00	$ 6 00	$ 7 75
1	2½ "	1 " "	6 "	4 50	6 50	8 75
2	2½ "	1¼ " "	6 "	5 00	7 00	10 50
3	2¾ "	1¼ " "	6 "	5 75	8 00	14 00
4	3 "	1½ " "	6 "	6 25	10 00	17 00
5	3¼ "	1½ " "	6 "	6 75	13 00	21 00
6	3½ "	2 " "	6 "	8 00	18 00	27 00

†Fitted for other sizes of Pipe, but always as listed, unless otherwise ordered.

*All Brass except Lever, Bearer and Base.

DEEP WELL PUMP—STANDARD.

STANDARD COMPLETE.
*Fitted for 1¼ inch Pipe.
Stroke, 7 inches.
Height, 51½ Inches.
Price, $10.00.

*Fitted for 1½, 2 or 2½ in. Pipe, when so ordered.
Extra pipe flanges, 50c each.

ANTI-FREEZING PUMP.

With Set Length

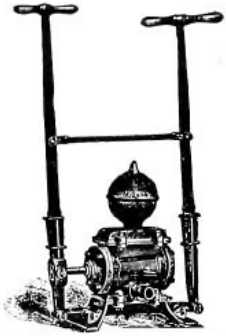
No.	Size Cyl.	Fitted for.	Open Top.	*Standard.	Closed Top.	*Standard
1	2½ in.	1 in. Pipe.	$7 00	$4 00	$7 75	$4 75
2	2½ "	1¼ " "	7 50	4 00	8 25	4 75
3	2¾ "	1¼ " "	8 00	4 50	8 75	5 25
4	3 "	1½ " "	8 50	5 00	9 25	5 75
5	3¼ "	1¾ " "	9 00	5 50	9 75	6 25

*The "Standard" means complete parts of Pump above, and including the base.

HAND BOILER FEED PUMP.

Description.	Size Cylinder.	Suction and Discharge.	Plain Valves. Price.
With Check Valve.	2 inch.	1 inch.	$10 00
Without " "	2. "	1 "	8 00

TRIUMPH DOUBLE ACTING FORCE PUMP.



No.	Size Cylinder.	Suction Fitted for.	Discharge Fitted for.	Stroke.	Iron. Price.	Brass. Price.
1	2½ in.	1¼ in. Pipe.	1 in. Pipe.	4½ inch	$27 00	$75 00
2	3 "	1¼ " "	1 " "	4½ "	27 00	75 00
3	4 "	1½ " "	1¼ " "	4½ "	28 00	90 00
4	5 "	2 " "	1½ " "	5 "	42 00	150 00

No.	Size Cylinder.	*Suction Fitted for.	Discharge Fitted for.	Stroke.	Iron. Price	Brass. Price.
4	5 inch.	2 in. Pipe.	1¼ in. Pipe.	6 inch.	$45 00	$125 00
5	6 "	2½ " "	2 " "	6 "	60 00	175 00

*Fitted for both Iron Pipe and Hose, as listed, but will be fitted for Lead Pipe when so ordered. Furnished with flat Air Chamber at same prices when so ordered. With Brass Spring Piston, No. 4, $6.00, and No. 5, $8.00, extra list.

-Bottom Suction.

THE "MARINE" BILGE PUMPS.

WITH BRASS-LINED CYLINDER AND REVERSIBLE LEVER.

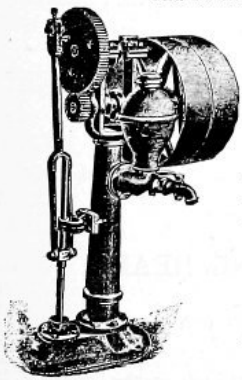
No.	Diam. of Cylinder.	†Suction Flange for.	Length of Stroke.	Capacity per Stroke.	Fig. 1799 Price.	Fig. 1800 Price.
2	6 inches	3 inch pipe	4 inches	.49 gals.	$23.00	$26.00
4	8½ "	4 " "	6 "	1.47 "	30.00	35.00

† The suction flange may be fitted for other sizes of pipe, but is always fitted as listed, unless otherwise ordered. Suction hose nipples furnished when ordered.

*Side Suction.

DEEP WELL FORCE PUMP STANDARD.

WITH GEARING, ADJUSTABLE STROKE, AND TIGHT AND LOOSE PULLEYS.



The annexed cut represents our new Geared Deep Well Force Pump Standard, arranged with adjustable stroke (6, 8 and 10-inch) and tight and loose pulleys for operating by belt. The Gearing is arranged to increase power, three to one. Any of our Independent Cylinders of suitable length may be used in connection with this Standard.

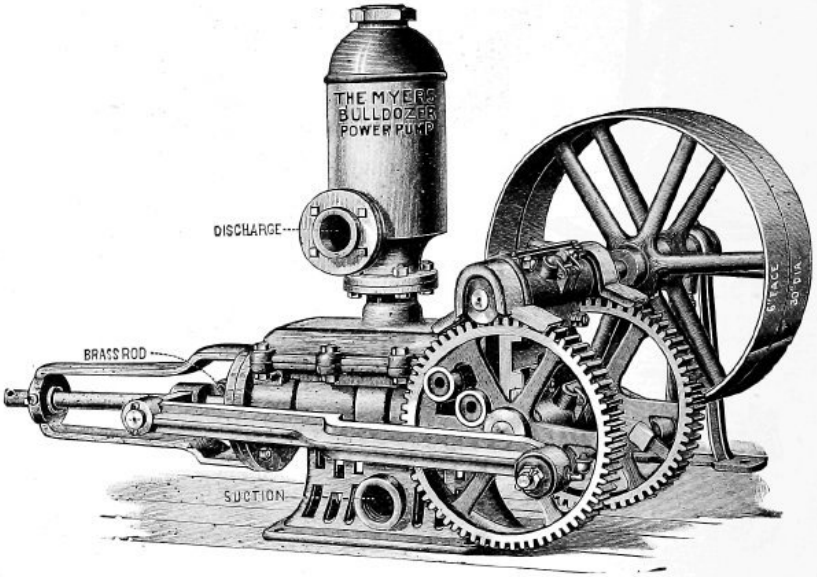
The speed at which this Pump should be run varies with the depth of well. In a shallow well it may, of course, be run faster than in a deeper well. At 100 feet deep it should be run about 50 revolutions per minute, or less.

SIZES AND PRICES.

No.	*Suction Fitted for	Stroke.	Size of pulleys	Discharge	With Pulleys. Price.	With fly wheel. Price.
1	1½ in. pipe.	6, 8 & 10 in.	20 x 5 in.	With Flange for ¼ in. pipe.	$78 00	$76 00
2	1½ " "	6, 8 & 10 in.	20 x 5 in.	With double discharge air chamber.	81 00	78 00
3	1½ " "	6, 8 & 10 in.	20 x 5 in.	With air chamber and cock.	83 00	80 00

*Fitted for 1¼, 1½, 2, 2½ or 3-inch suction: and 1¼, 1½, 2 or 2½-inch discharge pipe, but always fitted for 1½-inch suction and 1¼-inch discharge unless otherwise ordered.

BULLDOZER POWER PUMP.



Double Acting. Capacity, 3,600 Gallons per Hour. Back Geared Eight to One.

No. 363. Bulldozer Power Pump with 6 inch brass lined cylinder, 30x6 inch pulleys. Price.....$250 00

Capacity, 35 Gallons per Minute.

No. 351. Bulldozer Power Pump, with 4 inch brass lined cylinder, 24x4 inch pulleys. Price..... 120 00

Capacity, 30 Gallons per Minute.

No. 353. Bulldozer Power Pump, with 5 inch brass lined cylinder, 5 inch stroke and outer shaft support. Price..... 75 00

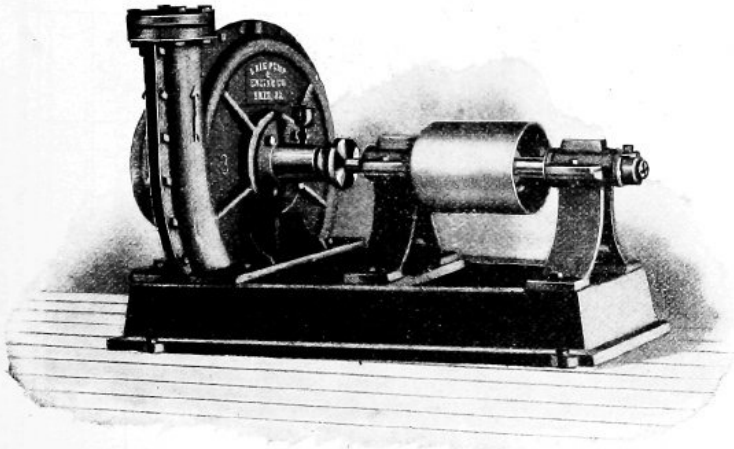
BULLDOZER POWER WORKING HEAD.

No. 359. Bulldozer Power Working Head, with 5, 7½ and 10 inch stroke, without cylinder or pipe. Price.....$ 75 00

No. 364. Bulldozer Power Working Head, with 12, 16 and 20 inch stroke, without cylinder or pipe. Price..... 150 00

Write for catalogue of complete line.

CENTRIFUGAL PUMPS.



The cut on this page represents our **right hand** Standard Horizontal Pump arranged for belt drive. These pumps are furnished either right or left hand, as desired, **but unless otherwise ordered, the right hand pump is always shipped.**

This Table gives the Number of Revolutions at which our Improved Pumps should run to Raise Water to Different Heights.

	FEET 5	FEET 10	FEET 15	FEET 20	FEET 25	FEET 30	FEET 35	FEET 40	FEET 50	FEET 60	FEET 70	FEET 80	FEET 90	FEET 100
No. 1¼	426	603	740	850	953	1046	1130	1211	1350	1478	1597	1705	1812	1905
1¾	341	484	592	683	765	837	905	977	1081	1216	1282	1368	1451	1530
2	323	460	564	650	727	796	886	920	1028	1127	1217	1302	1381	1456
2¼	314	446	546	630	705	772	835	892	997	1092	1180	1262	1337	1411
3	300	426	521	602	660	737	796	852	952	1043	1127	1205	1277	1322
4	283	398	480	557	621	694	752	808	895	992	1054	1138	1220	1275
5	250	357	437	505	565	619	692	715	800	876	946	1012	1073	1128
6	215	300	370	426	485	522	562	609	675	745	790	860	940	965
8	182	258	316	365	408	447	483	518	577	633	686	730	776	835
10	168	237	291	336	375	411	443	475	531	582	626	671	712	751
12	133	189	231	267	300	327	353	378	423	463	501	536	568	600
15	108	154	189	216	242	266	286	307	343	377	407	436	462	487
18	92	135	160	180	203	231	246	277	304	323	352	374	400	413
22	80	112	139	160	178	197	212	227	253	277	300	321	340	358

The above speeds are approximately correct under usual conditions of piping.

Large pipes economize power.

Add two feet to lift for each elbow; this allows for friction.

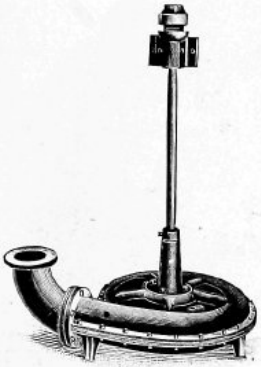
SPECIFICATIONS OF HORIZONTAL PUMPS—IRON AND BRASS.

No. of Pump.	Suction Flange Tapped for Pipe. (Inches.)	Economical Capacity. Gallons per Minute.	Horse Power recommended for each foot of lift.	Diameter and Face of Pulley. (inches.)	Floor Space in inches.	Shipping Weight in Pounds.	Price of Iron Horizontal Pump Standard.	Price of Iron Horizontal Pump with Steam Primer fitted.	Price of Brass Pump.	Price of Brass Pump with Steam Primer fitted.	Price of Double Suction Iron Pump.
1½	2½	62 to 74	.028 to .034	5 x 5	18 x 32	170	$ 45 00	$ 55 00	$ 85 00	$ 105 00	$ 60 00
1¾	3	70 to 100	.041 to .048	6 x 6	18 x 32	200	60 00	70 00	100 00	120 00	75 00
2	4	105 to 125	.054 to .065	7 x 7	25 x 40	350	75 00	90 00	125 00	150 00	90 00
2½	4	150 to 180	.076 to .091	7 x 8	25 x 40	390	90 00	105 00	150 00	175 00	100 00
3	5	230 to 276	.117 to .140	7 x 8	25 x 42	430	110 00	130 00	175 00	210 00	125 00
4	6	400 to 475	.202 to .243	8 x 10	29 x 43	610	130 00	155 00	275 00	330 00	175 00
5	6	625 to 750	.316 to .377	10 x 10	32 x 56	905	165 00	195 00	340 00	420 00	250 00
6	8	900 to 1080	.455 to .545	12 x 12	32 x 58	1135	200 00	240 00	410 00	495 00	350 00
8	10	1560 to 1820	.789 to .947	18 x 12	44 x 67	1590	310 00	375 00	.....	.....	500 00
10	12	2460 to 2950	1.24 to 1.50	20 x 12	50 x 72	2415	395 00	470 00	.....	.....	775 00
12	14	3630 to 4355	1.84 to 2.21	24 x 14	54 x 82	3835	500 00	575 00	.....	.....	1100 00
15	18	6270 to 7520	3.17 to 3.80	30 x 16	58 x 90	7050	850 00	930 00	.....	.....	1325 00
18	20	8830 to 10590	5.06 to 6.00	36 x 18	64 x 100	9100	1300 00	1390 00	.....	.....	2050 00

No. of Pump is same as diameter of discharge flange.

When more than 25 feet of discharge pipe is used it is advisable to use pipe a size or two larger than the pump discharge.
Pumps furnished with either suction or discharge flanges to fit any size pipe without extra charge, if so ordered.

VERTICAL CENTRIFUGAL PUMP.



SIZES AND PRICES.

No.	Economical Capacity, in Gallons per Minute.	Horse-Power Required for each Foot Elevation.	Diameter and Face of Pulley in inches.	Floor Space Required in inches.	Distance from Bottom of Pump to Center Coupling.	Coupling Bored for Shaft—Size of Shaft, inches.	Shipping Weight in pounds.	Price of Pump, with Elbow, one pair Couplings, Pulley, and one Bearing.
1½	70	.058	5x 6	17x 21	2ft. 9in.	1	110	$ 40 00
1¾	90	.075	6x 6	21x 29	3 " 0 "	1	165	50 00
2	120	.10	7x 8	23x 30	3 " 4 "	1 1/16	198	65 00
2½	180	.15	7x 8	24x 30	3 " 4 "	1 1/16	220	80 00
3	260	.22	7x 8	25x 32	3 " 6 "	1 1/16	235	95 00
4	470	.30	8x10	29x 39	4 " 0 "	1 7/16	380	110 00
5	735	.45	10x10	34x 45	4 " 7 "	1 11/16	605	140 00
6	1050	.59	12x12	37x 48	4 " 7 "	1 11/16	740	170 00
8	2000	1.00	18x12	45x 56	5 " 5 "	2	1320	265 00
10	3000	1.52	20x12	51x 68	5 " 5 "	2	1430	330 00
12	4200	2.00	24x14	63x 72	6 " 0 "	2 1/16	2640	420 00
15	7000	3.50	30x16	77x102	6 " 6 "	3 1/16	4830	600 00
15*	7000	3.50	30x15	60x 71	6 " 6 "	3 1/16	2400	480 00
18	10000	4.50	36x18	98x126	7 " 0 "	3 3/16	5300	950 00
18*	10000	4.50	30x16	66x 78	6 " 6 "	3 1/16	2600	850 00
20	12000	5.40	36x20	73x 92	4 " 6 "	4	4300	1255 00

*Refers to low-lift Pumps. Number of Pump is also diameter of discharge opening in inches.

HYDRAULIC RAM.

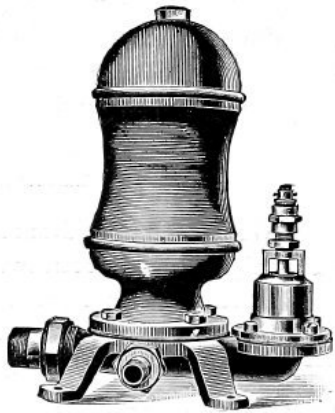


TABLE SHOWING EFFICIENCY OF THE HYDRAULIC RAM.

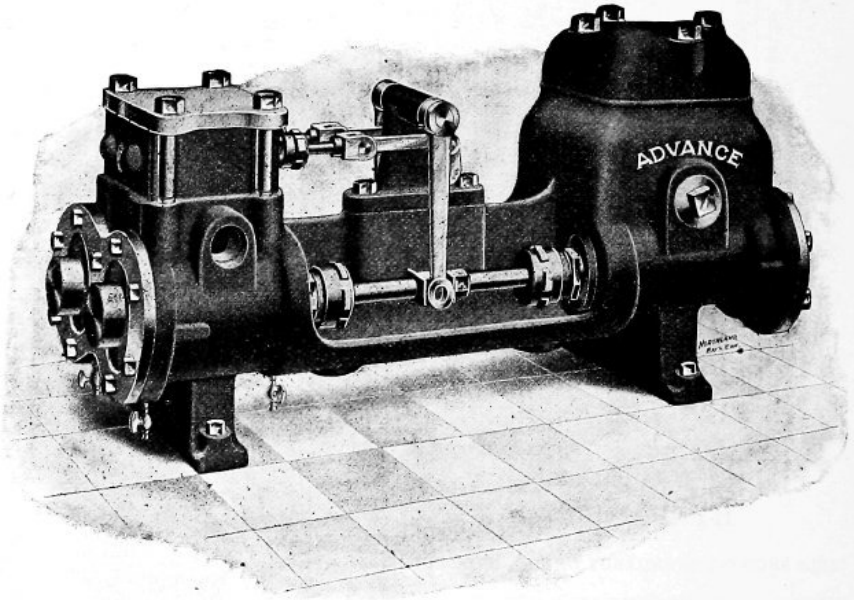
Minimum fall of water, in feet, under which Ram will effectively elevate water to the height given below.	2	2	2	3	4	5	6	7	8	10	12
Height in feet water may be elevated	4	6	8	15	24	35	48	63	80	100	120
Length of Drive Pipe in feet.....	12	12	12	15	20	30	40	50	60	75	95

N. B.—The length of the Drive or Supply Pipe should not be less than three-fourths of the height to which the water is to be raised, or five times the height of supply; it may, however, be longer.

SIZES AND PRICES.

No.	Quantity of water supplied to the Ram.	Length the Drive Pipe should be.	Calibre of Pipe. Drive.	Calibre of Pipe. Discharge.	Price.
2	½ to 2 gallons per minute	12 to 50 feet	¾ inch	½ inch	$ 9 00
3	1½ " 4 " " "	12 " 50 "	1 "	½ "	11 00
4	3 " 7 " " "	12 " 50 "	1½ "	¾ "	14 00
5	6 " 14 " " "	25 " 100 "	2 "	1 "	22 00
6	12 " 25 " " "	25 " 100 "	2½ "	1¼ "	40 00
7	20 " 60 " " "	25 " 125 "	4 "	2 "	75 00
8	30 " 120 " " "	25 " 150 "	6 "	3½ "	125 00

ADVANCE DUPLEX PUMPS.



The Best Duplex Pump in the World.

We have in the Advance Pump something new in pumping machinery. Old principles have been swept aside for something better, for we have produced results hitherto unknown in Duplex Pumps.

Not for many years has this type of pump materially changed. While the general design is similar, we have three distinct characteristics not found in other Duplex Pumps.

First. **Advance Pumps do not Short Stroke:**

Second. Advance Pumps use less steam than other Duplex Pumps.

Third. Advance Pumps cannot be injured by breaking suction at any speed.

These features give us a pump without an equal, with a record unapproached by any other Duplex Pump ever built.

ADVANCE DUPLEX STEAM PUMPS.

"The Best Duplex Pump in the World."

PISTON PUMPS FOR GENERAL SERVICE.

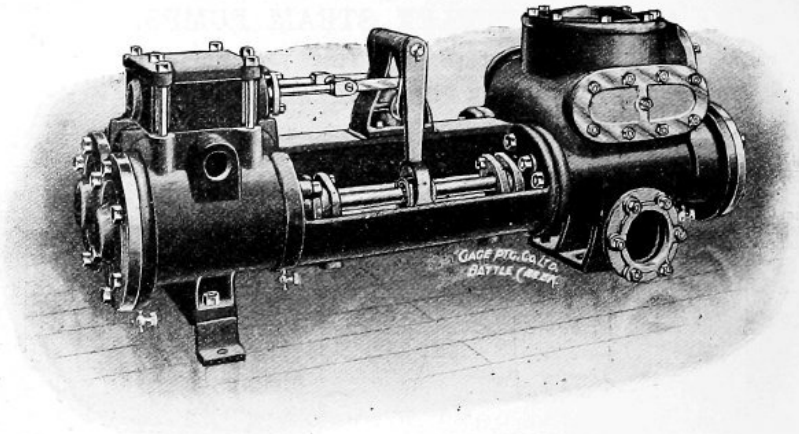
Where working pressures do not exceed 150 lbs. per sq. in.

Diameter Steam Cylinder.	Diameter Water Cylinder.	Length of Stroke.	Proper strokes per minute of one plunger, varying with work and pressure.	Gallons delivered per minute by both plungers at stated number of strokes.	Diameter required by single pump to do same work at same speed.	Size of Pipe for short lengths. Increase size as length increases.			
						Size of Steam Pipe.	Exhaust Pipe.	Suction Pipe.	Discharge Pipe.
3	2	3	100 to 250	8 to 20	2⅞	⅜	½	1¼	1
4½	2¾	4	100 " 200	20 " 40	4	½	¾	2	1½
5¼	3½	5	100 " 200	40 " 80	5	1	1¼	2½	1½
6	4	6	100 " 150	70 " 100	5⅝	1	1½	3	2
7	4½	8	100 " 150	95 " 160	6⅜	1¼	1½	4	3
8	5	10	75 " 125	130 " 220	7⅛	1½	2	5	4
10	6	10	75 " 125	180 " 300	8½	2	2½	5	4
12	7	12	75 " 125	245 " 490	9⅞	2½	3	6	5
12	8½	12	75 " 125	365 " 730	12	2½	3	6	5
14	7	12	75 " 125	245 " 490	9⅞	2½	3	6	5
14	8½	12	75 " 125	365 " 730	12	2½	3	6	5
16	8½	12	75 " 125	365 " 730	12	2½	3	6	5
16	10	12	75 " 125	610 " 1015	14⅛	2½	3	8	7
16	12	12	75 " 125	730 " 1220	17	2½	3	10	8
18	10	12	75 " 125	610 " 1015	14⅛	3	4	8	7
18	12	12	75 " 125	730 " 1220	17	3	4	10	8
18	14	12	75 " 125	990 " 1660	19¾	3	4	12	10
20	10	12	75 " 125	610 " 1015	14⅛	4	5	8	7
20	12	12	75 " 125	730 " 1220	17	4	5	10	8
20	14	12	75 " 125	990 " 1660	19¾	4	5	12	10

Larger or Special Pumps Subject to Correspondence.

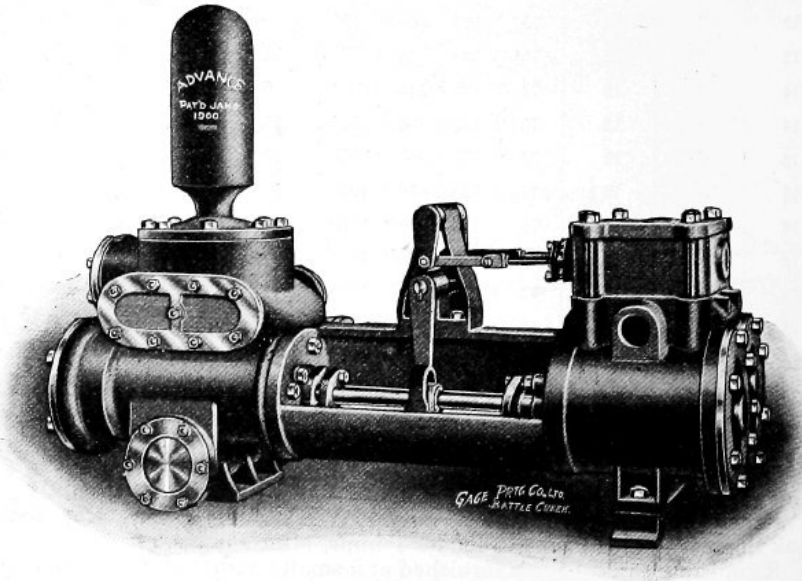
Receiver Pumps for Heating Systems, Wet Vacuum Pumps, Low Service Tank Pumps, Center Packed Plunger Pumps, Mine Pumps, etc.

Removable Brass Liners furnished at a small additional cost. Ball Valve Pumps subject to special list and correspondence. Pumps brass fitted on special order with Tobin Bronze Piston Rods, etc., at a small additional cost.

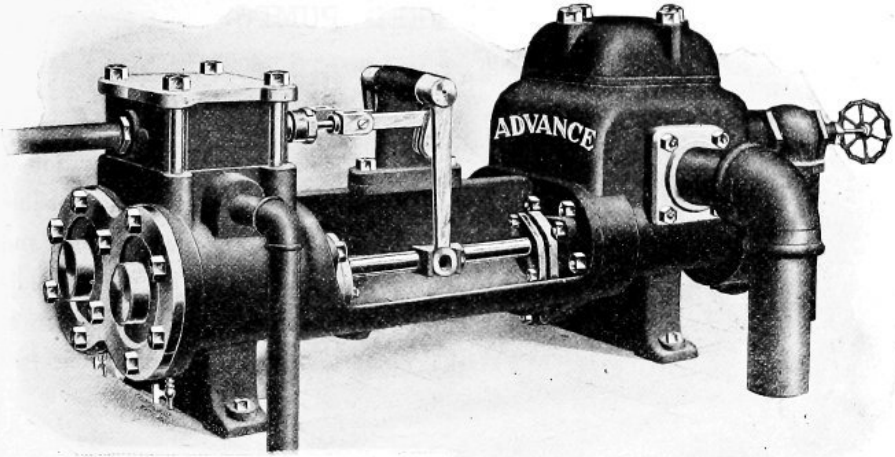


Sizes 8x5x10 and 10x6x10.

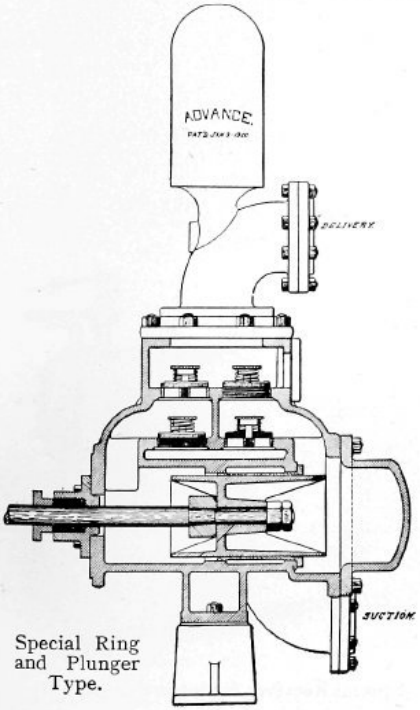
Sizes shown above are built *without air chambers*, which, however, may be had when especially ordered.



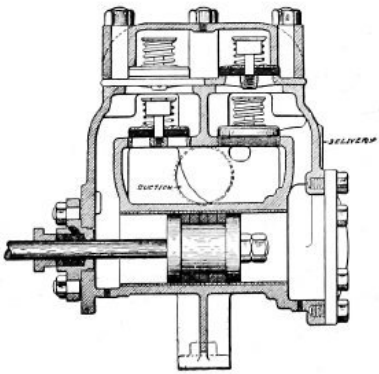
Special Construction with Air Chamber.
Sizes 8x5x10 and 10x6x10.



The above illustration shows our 7x4½x8 pump with open yoke, giving maximum of efficiency with minimum weight. A very popular size.

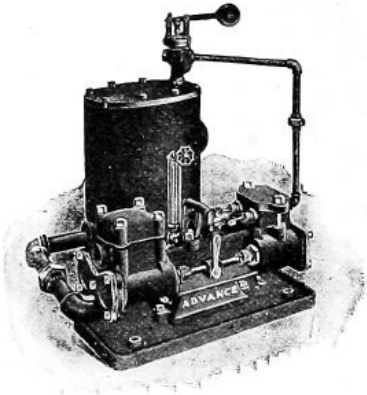


Special Ring and Plunger Type.



Boiler Feeder—Water End Section.

AUTOMATIC FEED PUMPS.



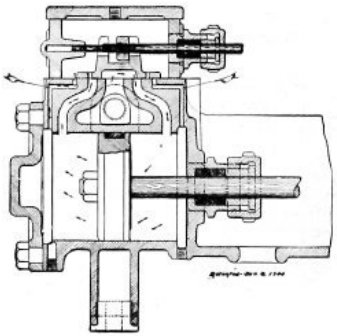
3x2x3 and Receiver.

Receivers Attached.

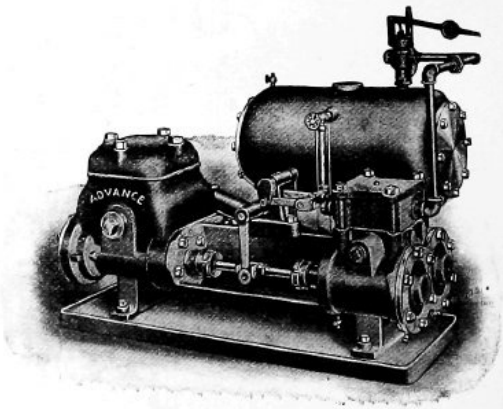
With this equipment, condensation is returned to the boiler at highest possible temperature, while the pump starts and stops automatically as the receiver fills and empties, adding to the efficiency of the plant and materially reducing fuel bills.

Size of Pump.	Good for Radiating Surface.
3 x2 x3	4,500 square feet
4½x2¾x4	10,000 " "
5¼x3½x5	20,000 " "
6 x4 x6	35,000 " "
7 x4½x8	60,000 " "

Brass fittings at small additional cost.

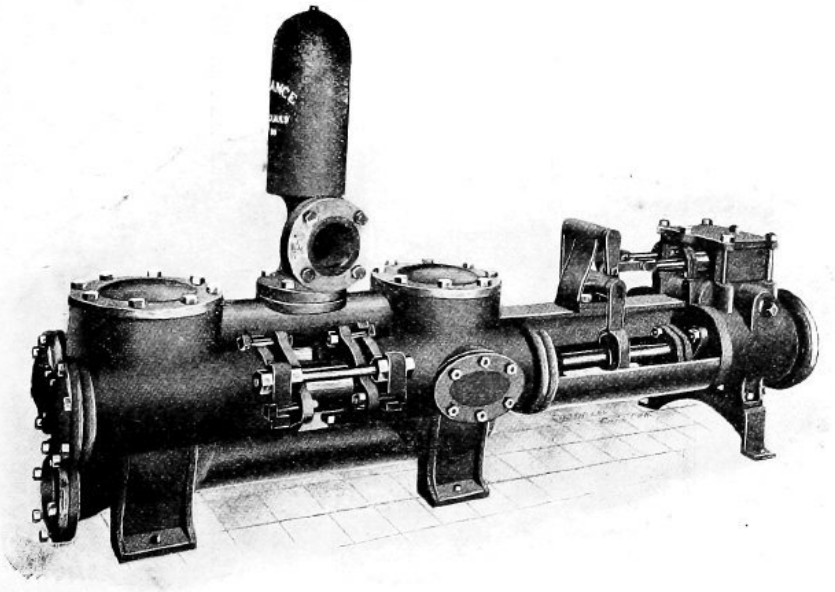


Steam End.



Special Receiver for large Pumps.

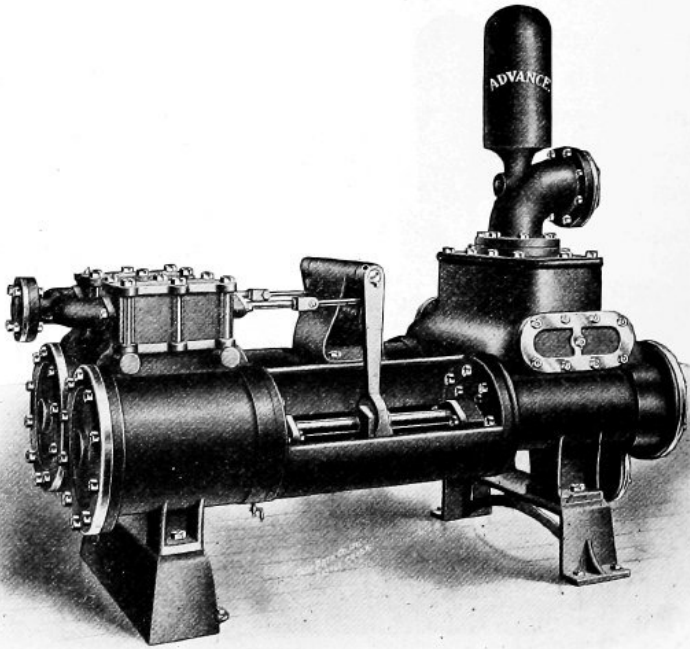
CENTER PACKED PLUNGER PUMPS.



Sizes: 8x5x10 (Charles), 10x6x10 (Caroline).

WET VACUUM PUMPS.

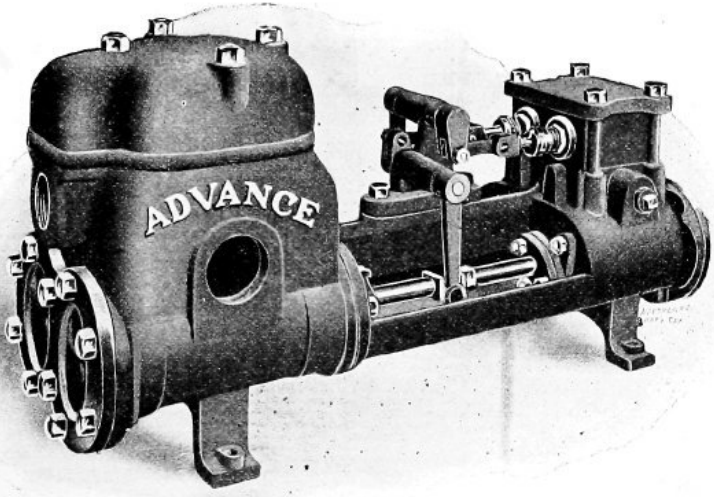
Steam Cylinder.	Water Cylinder.	Piston Stroke.	Square feet heating surface pumps of given size will take care of.	Steam.	Exhaust.	Suction.	Discharge.
4½	3¾	4	8,000	½	¾	2½	2
5¼	4¾	5	11,000	1	1¼	3	2½
6	5¾	6	25,000	1	1½	4	3
7	6	8	30,000	1¼	1½	5	4



Sizes: 12x7x12; 12x8½x12; 14x7x12; 14x8½x12.

In larger pumps, the Ring and Plunger design (see page 477) may be had by special order.

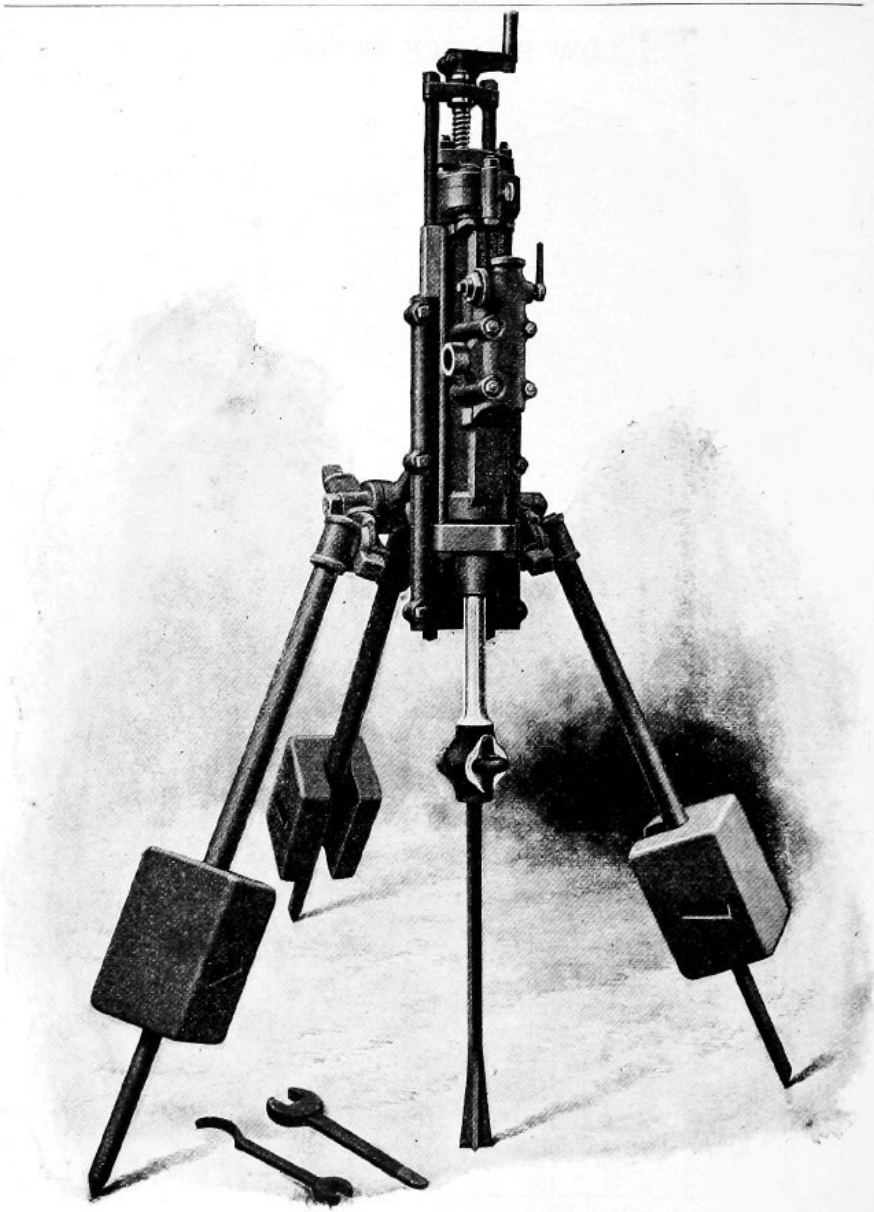
LOW SERVICE PUMPS.



PACKED PISTON TYPE.

This design is identical with the General Service Pumps excepting that the steam ends are made smaller in proportion to the size of the water ends. They are intended for raising liquids to moderate heights with ordinary steam pressures. Water ends are good for a working pressure of 80 lbs. per square inch. Other sizes and combinations than those given below, subject to special correspondence.

Steam Cyl.	Water Cyl.	Piston Stroke	Proper Strokes per Min. Varying with Work and Pressure.	Gallons per Minute.	Steam.	Exhaust.	Suction.	Dischrge.
4½	3¾	4	100 to 200	40 to 80	½	¾	2½	2
5¼	4¾	5	100 " 200	75 " 110	1	1¼	3	2½
6	5¾	6	100 " 150	130 " 195	1	1½	4	3
7	6	8	100 " 150	195 " 292	1¼	1½	5	4
7	6¾	8	100 " 150	248 " 372	1¼	1½	5	4
8	7	10	75 " 125	245 " 410	1½	2	6	5
10	8½	10	75 " 125	365 " 610	2	2½	6	5
12	10	12	75 " 125	610 " 1,015	2½	3	8	7
12	12	12	75 " 125	730 " 1,220	2½	3	10	8
12	14	12	75 " 125	990 " 1,660	2½	3	12	10
14	10	12	75 " 125	610 " 1,015	2½	3	8	7
14	12	12	75 " 125	730 " 1,220	2½	3	10	8
14	14	12	75 " 125	990 " 1,660	2½	3	12	10



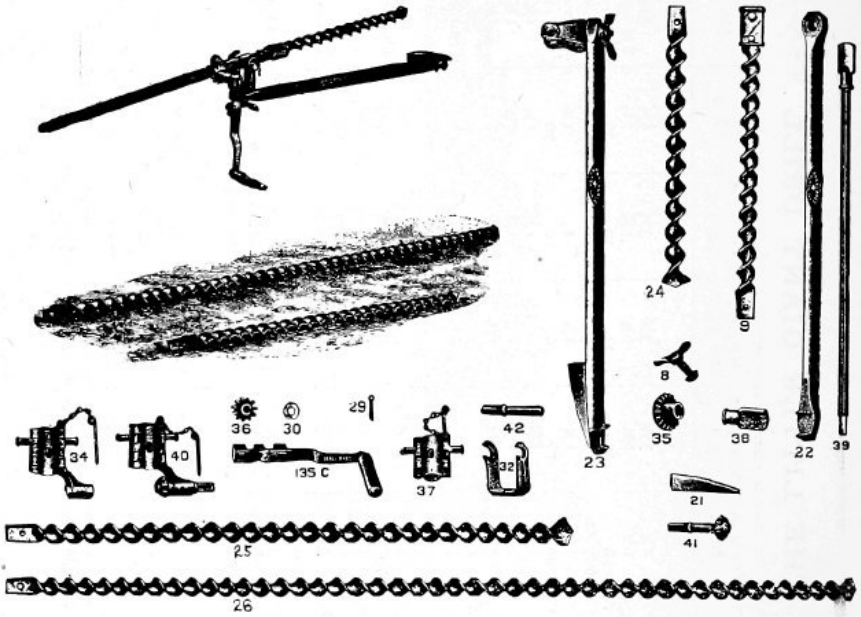
THE LITTLE GIANT ROCK DRILL.

SPECIFICATIONS OF THE LITTLE GIANT DRILL

Name and number	Kid Drill for Block Holing	No. 1	Nos. 2 and 2-A	Nos. 3 and 3-A	Nos. 3¼ and 3¼-A	Nos. 4 and 4-A	No. 5	No. 7
Dimensions:								
Diameter of cylinder, in inches	1⅞	2¼	2¾	3⅛	3¼	3⅝	4½	5½
Length of stroke, in inches	3⅝	5¼	6¼	6¾	6¾	7½	7½	8½ (extreme)
Length of feed, in inches	10	15	18	24	24	30	36	30
Usual depth of hole drilled, feet	1½	4	6 to 10	10 to 15	15	20	20 to 30	...
Usual diam. bottom of hole, ins.	1	1 1/16	1½	1¾	1¾	2	2¼	...
Depth drilled in ten hours, feet	...	50	60	70	70	70	70	...
Diameter of steel, in inches	⅝	¾	1	1⅛	1⅛ or 1¼	1⅜	1½	1¾
Diameter of hose, in inches	¾	¾	¾	1	1	1¼	1½	1½
Diam. steam pipe, 150 ft. long, ins.	¾	1	1¼	1½	1½	2	2	2½
Size of boiler required to run drill by steam, in horse-power	3	5	7	10	10	12	15	20 to 23
Weights:								
Drill, unmounted, in pounds	95	150	200†	265‡	290	390§	560	860 (including shell)
Adjustable tripod, no weights, lbs.	70	70	145	175	175	354	400	510
Set tripod weights (3 to set), lbs.	108	210	288	336	336	510	510	...
Drill m'ted on tripod with w'ts, lbs.	273	430	633	776	801	1254	1470	...
Drifting column, 6 ft. high, lbs.	...	185	319	319	319	405	...	...
Shipping measurements (outside):								
Of box for drill alone, in inches	42x13x10	42x13x11	45x13x11	48x14x11	48x14x13	58x16x13	61x19x14	80x25x15
Of box for tripod, in inches	36x 8x 6	36x 8x 6	40x 8x 8	45x10x10	45x10x10	51x14x14	...	...
Of box for six lengths of hose, ins.	34x34x24	34x34x24	34x34x24	34x34x24	34x34x24	34x34x24	...	...
Prices:								
Of drill complete, unmounted	$125 00	$185 00	$200 00	$250 00	$275 00	$350 00	$400 00	...
Adj'ble tripod and w'ts, complete	25 00*	30 00	50 00	50 00	50 00	60 00	65 00	...
Of column 6 feet high	...	50 00	50 00	50 00	50 00	60 00	...	...
Of drill with tripod and weights or column, complete	150 00	215 00 / 235 00	250 00	300 00	325 00	410 00	465 00	...

* Plain tripod. † Weight of 2-A drill is 210 pounds. ‡ Weight of 3-A drill is 275 pounds. § Weight of 4-A drill is 410 pounds.

"QY" ARM BOX GRIP DRILL.



Grip Drill, Complete, with Side and End Gear, and Three Augers

EXTRA PARTS.

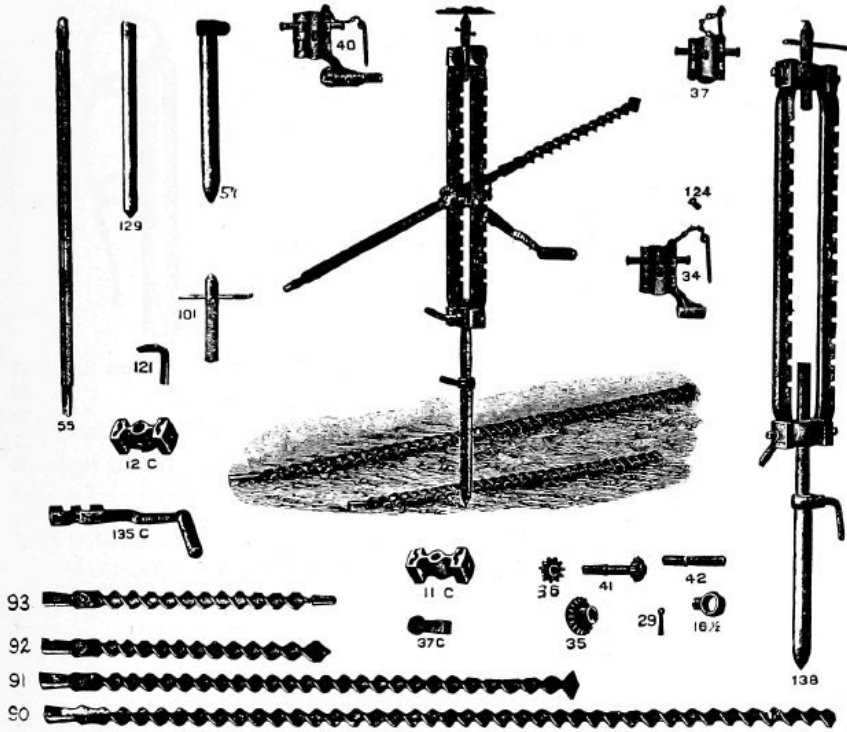
(Order by Number Only.)

NO.		EACH
8.	Bolt and Thumb Nut for Chair	$ .25
9.	Auger Extension, 2 feet long	.95
21.	Steel Wedge for Grip	.25
22.	Grip Bar	1.75
23.	Grip Bar, complete	2.75
24.	Short Auger, 2 feet long	.92
25.	Medium Auger, 4 feet long	1.84
26.	Long Auger, 6 feet long	2.76
29.	Spring Key for Crank	.05
30.	Steel Washer for Crank Shaft	.05
32.	Open Chair for Grip	.55
34.	Thread Box (Alloy Metal)	1.65
35.	Large Gear Wheel	.80
36.	Small Gear Wheel	.55
37.	End Gear Thread Box (Alloy Metal)	.80
38.	Auger Socket	.35
39.	Thread Bar	2.75
40.	Boxing complete (Alloy Metal) with No. 42 Shaft and No. 36 Small Pinion	2.30
41	Thread Box Shaft with No. 36 Pinion complete	1.10
42.	Thread Box Shaft	.55
135-C.	Crank	.55

In Ordering Augers, specify whether same are wanted with Square or Feather Edge.

Average Weight of Drills, Complete, 60 lbs.

QY" NOTCHED POST DRILL.



Post Drill, Complete, with Side and End Gear and Three Augers,

Post Drill, Complete, with End Gear Only, and Three Augers,

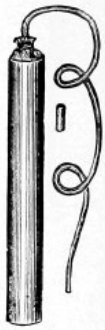
EXTRA PARTS.—(Order by Number and Name.)

NO.		EACH
11-C.	Casting for Post (Jack Screw No. 101 fits in)	$1.00
12-C.	Casting for Post (No. 129 fits in)	1.00
16½.	Ring for 1¼ inch Boot	.15
29.	Small Spring Key for Shaft	.05
34.	Thread Box (Alloy Metal)	1.65
35.	Large Gear Wheel	.80
36.	Small Gear Wheel	.55
37.	End Gear Thread Box (Alloy Metal)	.80
37-C.	Square Socket for Augers	.35
40.	Thread Box, complete (Alloy Metal) with No. 42 Shaft and No. 36 Small Pinion	2.30
41.	Thread Box Shaft, with No. 36 Small Pinion, complete	1.10
42.	Thread Box Shaft	$ .55
55.	Thread Bar	2.75
57.	Small Boot 1¼ in. in diameter	1.00
90.	Long, or 6-ft. Auger	2.76
91.	Medium, or 4-ft. Auger,	1.84
92.	Short, or 2-ft. Auger	.92
93.	Auger Extension, 2 ft. long	.95
101.	Jack Screw	.55
121.	Tail Set Screw	.15
124.	Set Screw for No. 11-C and No. 12-C	.10
129.	Small Sized Stem that fits in No. 57	.75
135-C.	Crank	.55
138.	Post, complete, as shown in cut	4.62

In Ordering Augers, specify whether same are wanted with Square or Feather Edge. When Ordering Drills or Posts, state thickness of the Vein of Coal in which they are to be used.

Average Weight of Drills, 70 lbs.

HERCULES DYNAMITE.



No. 1XX.	75	per cent.	Nitro-glycerine			per lb.,	$0 37
No. 1.	60	"	"	"		"	32
No. 2SS.	50	"	"	"		"	29
No. 2S.	45	"	"	"		"	27½
No. 2.	40	"	"	"		"	26
No. 2H.	30	"	"	"		"	24
No. 4B.	20	"	"	"		"	22

HERCULES SPECIAL GRADES.

No. HOOO.	Similar to	No. 1XX,	not so strong			per lb.,	$0 32
No. HOO.	"	" No. 1,	"	"		"	29
No. HO.	"	" No. 2SS,	"	"		"	27½
No. H1.	"	" No. 2S,	"	"		"	25
No. H2.	"	" No. 2,	"	"		"	24
No. H4.	"	" No. 2H,	"	"		"	22

Packed in cases of 25 and 50 lbs. We do not break cases.
The standard size of cartridge is 1¼ x8 inches. We can furnish any other size.

SAFETY FUSE.

Our usual packages are as follows:

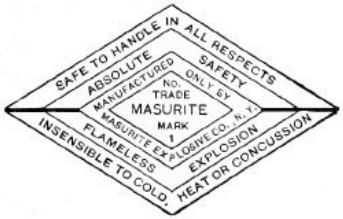
	Barrels.	Cases.	Boxes.	Per 1,000 feet.
Common Cotton Fuse, for use in dry ground	12,000	12,000	1,000	$4 35
Single Taped Fuse, for use in wet ground	8,000	6,000	1,000	5 90
Double Taped Fuse, for use in very wet ground	8,000	6,000	1,000	6 30

ELECTRIC PLATINUM FUSES.

	4 ft. Wires.	6 ft. Wires.	8 ft. Wires.	10 ft. Wires.	12 ft. Wires.	14 ft. Wires.	16 ft. Wires.	18 ft. Wires.	20 ft. Wires.
Single strength...per 100,	$3 00	3 54	4 08	4 62	5 16	5 70	6 24	6 78	7 32
Double " ... "	3 75	4 29	4 83	5 37	5 91	6 45	6 99	7 53	8 07

Packed 50 in a box, 500 in a case. We can furnish all sizes up to 30 feet.

MASURITE.



Masurite is a high-power blasting powder. It is made in two grades, one equal in strength to 40 per cent. dynamite and the other to 55 per cent. dynamite.

It is the only absolutely safe powder made. There is only one way it can be exploded, and that is with a special cap.

It will not freeze, and the fumes of the explosion are absolutely harmless. You can't get a headache from them.

It is for use in coal and ore both.

It is particularly adapted for use in coal mines. It will bring down as much coal as dynamite and just as good coal as black powder. The explosion is absolutely flameless, so it can be used where there is gas with perfect safety.

Prices quoted on application.

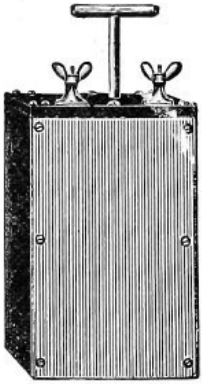
BLUE LABEL SAFETY SQUIBS.

The only absolutely safe squib on the market. Premature shots impossible where the Blue Label is used.

Made in both sulphur and gas.

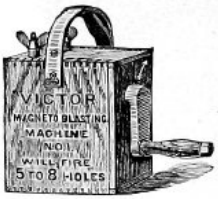
100 squibs in a box. 100 boxes in a case. Price.....per case, $10 00

ELECTRIC BLASTING APPARATUS.



The "R. D. T." Blasting Machine.

Fire 1 to 5 holes.
Price.....$10 00



Victor Blasting Machine.

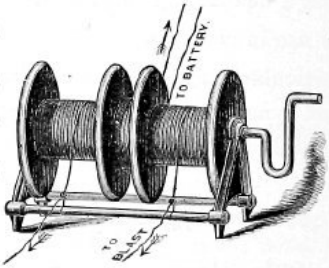
One size only.
Will fire 5 to 8 holes.
Price.....$15 00

"Pull Up" Blasting Machine.

No. 3. Will fire 20 to 30 holes.
Price.....$25 00
No. 4. Will fire 40 to 50 holes.
Price.....$50 00
No. 5. Will fire 75 to 100 holes.
Price.....$75 00

United States Standard Blasting Machine.

No. 3. Will fire 1 to 20 holes.
Price.....$25 00
No. 4. Will fire 40 to 50 holes.
Price.....$50 00



Leading Wire Reel.

Price..$4 00

Connecting Wire Holder.

Price.....$2 00

Leading Wire.

Per lb.....

Prices quoted on application.

GENUINE FROSTBURG DRIVERS' LAMPS.

This Lamp is the best made Lamp in the market; is made of the heaviest and best tin that is manufactured. It is called by many the Coffee Pot Lamp. It is the old Genuine Frostburg pattern. They are put up 1 dozen in a box.

	Per doz.
Large, single spout	$
Small, " "	
Long, " "	
Double spout	
Shield, Drivers'	

MINERS' AND DRIVERS' LAMPS.

	Per doz.
Frostburg Miners' Lamps	$
" Drivers' "	
Gen. Monon. Val. Miners' Lamps	
" Monon. Val. Drivers' Lamps	
Im. Monon. Val. Miners' Lamps	
No. 1 Chirry Miners' Lamp, small spout	
No. 1 Chirry Miners' Lamp, large spout	
Chirry Drivers' Lamp, single spout	
Chirry Drivers' Lamp, double spout	
Brass Top Drivers' Lamp	
Highberger Miners' "	
" Drivers' "	

COMMON MINERS' LAMPS.

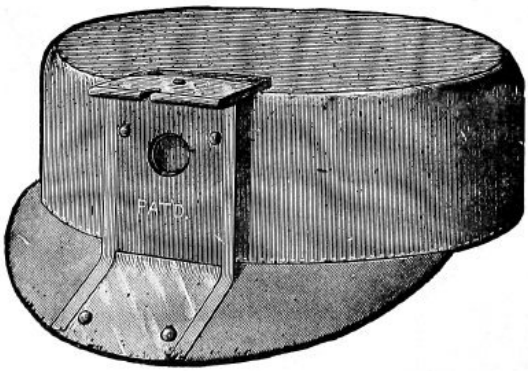
In 1 dozen lots	per doz., $
" 6 " "	"
" gross lots	"

GEO. ANTON "STAR" LAMPS.

No. 1. Miners' Lamp, per doz.....$
No. 2. Miners' Lamp, per doz.....
Drivers' Lamp, per doz.....
Globe Miners' Lamp, per doz.....
Globe Drivers' Lamp, per doz.....

Miners' Lamps, double spout, brass, all one piece.....per doz., $
Drivers' " " " " " " " ..... "
Miners' " " " copper..... "
Drivers' " " " " ..... "

COAL MINERS' CAP.



No. 9. Fiber and tin front, which neither fire, water nor oil will affect.

All practical miners will know it is a desirable article. The cut on this page is an exact representation of the cap. We make them in white, brown, striped and oil cloth, with single visor.

Price, in 25 dozen lots.....per doz., $
" " less quantities..... "

LADDERS.

LONG.

10 feet,	weight	15 lbs	each,	$2	50
12 "	"	20 "	"	3	00
14 "	"	25 "	"	3	50
16 "	"	30 "	"	4	50
18 "	"	35 "	"	5	50
20 "	"	50 "	"	6	50

EXTENSION.

20 feet,	weight	38 lbs	each,	$ 7	00
22 "	"	44 "	"	7	50
24 "	"	50 "	"	8	00
26 "	"	55 "	"	9	00
28 "	"	60 "	"	9	50
30 "	"	70 "	"	10	00
32 "	"	75 "	"	11	00
34 "	"	80 "	"	11	50
36 "	"	90 "	"	12	50
38 "	"	95 "	"	13	50
40 "	"	100 "	"	15	00

STEP.

Made from selected lumber; 8 inch top; broad top shelf; every step doubly braced with iron strips at back, and corner irons on each leg brace; shelf forms a perfect lock when Ladder is open. We guarantee this Ladder to be absolutely safe. It is an ideal Ladder for store use and good family trade.

Feet	3	4	5	6	7
List	$2 50	3 00	3 50	4 00	4 50

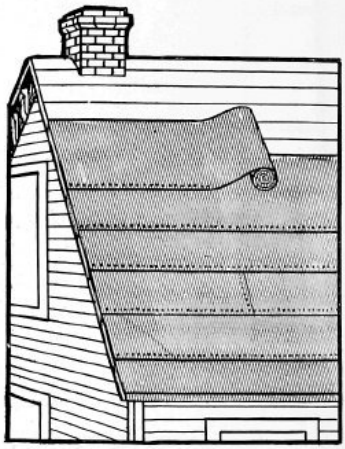
Feet	8	9	10	12	14
List	$5 00	5 50	6 00	8 00	10 00

Weights of all Step Ladders about 2½ lbs. per foot.

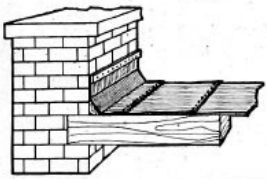
ROOFBESTOS.

INDESTRUCTIBLE ROOFING.

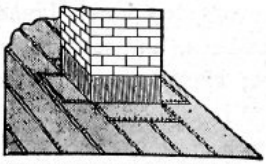
This Roofing is made of the best and strongest grade of Wool and Asbestine Felt, made especially for us, avoiding the many imperfections of cheaper grades. The Felt is thoroughly saturated with a waterproof composition of asphalt and rubber, after which it is coated with a rubber composition and vulcanized by passing it through heavy iron rolls which put a surface on it that is more durable than on any other roofing.



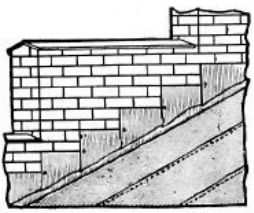
Laying on a Steep Roof.



Flashing and Counterflashing.



Flashing around Chimney.

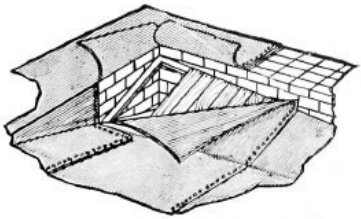


Step Flashing around Fire Wall.

"Roofbestos" is absolutely indestructible by the elements and is not affected by heat or cold. It is always pliable and elastic under all conditions, thus obviating expansion and contraction. It resists vibration and will not work loose at the seams if properly put on.

It is absolutely Fireproof and Waterproof. Impervious to vermin and acids. Will not melt, crumble or oxidize.

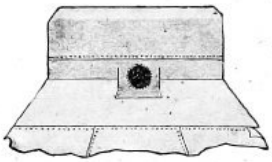
There is no coating or sanding necessary, as it is in a finished condition ready to lay when you receive it, and it is applicable to either steep or flat roofs and will wear as long as the building.



Covering Valley to Water Spout.

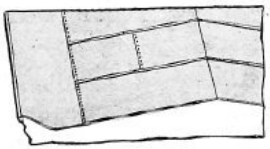
It is light and easily applied, and is far more economical to put on as it does not require skilled labor. Any man of ordinary ability can lay it perfectly.

Being a perfect non-conductor, it keeps the building warm in winter and cool in summer. Suitable for Factories, Barns, Sheds, Machinery Buildings, Power, Engine and Boiler Houses, Poultry and Sheep Pens, Railroad Depots, Lumber Yards, and in fact any place where it is desirable to have a light, durable, strong and handsome roof at a moderate cost. It has no taste or odor and rain water can be preserved untainted. It does not get sticky in hot weather and in fact there never has been roofing made to compare with Roofbestos.

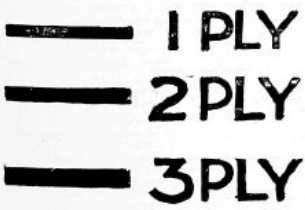


Joint around Down Spout.

Put up in 32 inch rolls 40½ feet long, containing 108 square feet, sufficient to cover 100 square feet on the Roof, allowing 2 inches for the laps. The NAILS, TIN CAPS and CEMENT for seams and directions for laying are packed in center of each roll. Double Rolls, 216 square feet, may be ordered for large buildings.



How to Form Gutters.



1 ply,	33 lb	. . . . .	per roll of	108	sq. feet,	$2	25
2 "	44 "	. . . . .	" " "	108	" "	3	25
3 "	54 "	. . . . .	" " "	108	" "	4	00

Fig. 75.

BOX TRUCK.

Low trucks, strong and well made, for handling large boxes or bales. Shave cone head bolts to prevent package from slipping. Axles turned and wheels bored.

Cipher.	No.	Size.	Size of Wheel.	Size of Frame.	Weight lbs.	Price, Each
Dabble	1	18 x 36 in.	3½ in.	3 x 3 in.	25	$3 50
Gallant	2	16 x 24 in.	3½ in.	3 x 3 in.	35	4 00
Garrison	3	16 x 24 in.	4½ in.	4 x 4 in.	95	4 50

Above can be furnished with rubbered wheels at an additional list price of $3.00

Fig. 164

SIX WHEELED BOX TRUCK.

Cipher.	No.	Size.	Diameter of Wheel.	Size of Frame.	Weight lbs.	Price, Each.
Gulf	12	16 x 24 in.	3½ in.	3 x 3 in.	28	$6 00
Guillotine	14	22 x 36 in.	4½ in.	2½ x 4 in.	70	10 00

Fig. 79

TOBACCO BOX TRUCK.

For moving heavy barrels or hogsheads. Top ironed. Same size as No. 3 Box Truck mentioned above.

Weight each, 45 lbs.

Cipher, Gypsy — Price each, $7 00

Fig. 76.

TILTING BOX TRUCK.

Same size as No. 3 Box Truck, with center wheels lowered so truck rocks on them and turns easily. *For moving heavy boxes.* Weight each, 35 lbs.

Cipher, Groom; with iron wheels. — Price each, $5 50.

Cipher, Guide; with patent rubbered wheels. — Price each, 7 00.

Fig. 170.

FOLDING BOX TRUCK.

(Pat. Applied For.)

This truck carried two ways when box is being loaded. It is easy to carry from place to place. The wheels are locked when truck is being loaded and automatically release themselves when box is on the truck. Frame made of 1¼ x 2-inch angle iron.

Weight each 35 lbs. — Cipher, Gammon — Price each, $6 00.

Fig. 111

IRON BOX TRUCK.

Frame made of angle iron. Size, 20 x 24 inches. Diameter of Wheels, 4 inches.

Weight about 35 lbs. — Cipher, Frost. — Price each, $5 00.

Fig. 46.

STOVE CARRIER.

Every dealer in stoves should have one of these carriers. They are light, yet strong. Can be used as a truck and are the most convenient thing for the purpose made.

Cipher, Thirst. — Price each, $8 00.

Fig. 15.

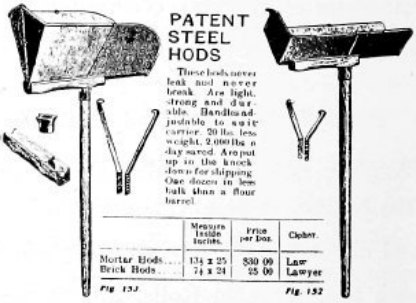
SKIDS.

Made of selected oak, rock elm or hickory. Ends heavily ironed. Oiled and varnished.

No.	Cipher.	Length and Kind.	Dimensions of Side Rails, Inches.	No. of Cross-Bars.	Weight in lbs. Each.
1	Cabbage	6 ft. Light	1¼ x 2½	3	20
2	Cable	6 ft. Heavy	1½ x 3	3	34
3	Caboose	7 ft. Light	1¼ x 2½	3	34
4	Calico	7 ft. Heavy	1½ x 3½	3	38
5	Caldron	8 ft. Light	1¼ x 2½	3	40
6	Capable	8 ft. Heavy	1½ x 3½	3	43
7	Captive	9 ft. Heavy	1½ x 3½	3	45
8	Career	10 ft. Heavy	1½ x 3½	3	59
9	Carnage	12 ft. Heavy	1½ x 4	4	65

Any size under six feet, same price as six feet.

Light Skids, 80c per foot. — Heavy Skids, $1.00 per foot.



PATENT STEEL HODS

These hods never leak and never break. Are light, strong and durable. Handle adjustable to suit carrier. 20 lbs. less weight, 2,000 lbs. a day saved. Are put up in the knock down for shipping. One dozen in less bulk than a flour barrel.

	Measure Inside. Inches.	Price per Doz.	Cipher.
Mortar Hods	13½ x 25	$30 00	Law
Brick Hods	7½ x 24	25 00	Lawyer

Fig. 153 — Fig. 152

HODS.

Western Pattern.

Box made of soft wood, kiln dried, and painted. Sides rabbeted. End piece grooved into sides, and all joints put together in white lead, making it water tight. Handle is riveted to a forked iron standard which holds the box. Box painted.

	Measure Inside. Inches.	Price per Doz.	Cipher.
Mortar Hods	22 x 10	$18 00	Carpenter
Brick Hods	20½ x 7½	15 00	Cartoon

Western Pattern. Fig. 120.

HALF BOUND.

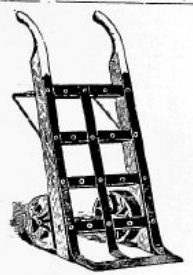
FULL BOUND

STEEL NOSE STORE AND WAREHOUSE TRUCKS—Western Pattern.

All our trucks have Steel Noses, Forged Axles and Turned Bearings.

DIMENSIONS.

No.	Cipher for Iron Wheel Trucks.	Description.	Weight, lbs.	Length of Handles, Inches.	Diameter of Wheels, Inches.	Width, Inches.	One Dozen Packed for Export Measure About.	*Price Each with Rubbered Wheels.	Price Each with Iron Wheels
0 W	Saber	Half Bound, Fig. 30.....	32	42	6	18	7 cu. ft.	$12 50	$6 00
1 W	Solly	Half Bound, Fig. 30....	43	48	7½	19	12 cu. ft.	15 00	7 00
2 W	Scamp	Half Bound, Fig. 30.....	60	52	8½	20	15 cu. ft.	18 50	9 00
3 W	Saloon	Half Bound, Fig. 30.....	77	56	9½	22	17 cu. ft.	24 00	13 00
4 W	Saturn	Half Bound, Fig. 30.....	110	62	10½	24	23 cu. ft.	32 00	16 00
21 W	Sash	Full Bound, Fig. 31	50	48	7½	19	13 cu. ft.	16 00	8 00
22 W	Satan	Full Bound, Fig. 31	68	52	8½	20	16 cu. ft.	19 00	10 50
23 W	Sage	Full Bound, Fig. 31	87	56	9½	22	18 cu. ft.	28 00	15 00
24 W	Sailor	Full Bound, Fig. 31	125	62	10½	24	24 cu. ft.	34 50	18 50



STEEL NOSE RAILROAD AND STEAMBOAT TRUCKS—Western Pattern.

All our Trucks have Steel Noses, Forged Axles and Turned Bearings.

EXTRA HEAVY, FULL BOUND.

DIMENSIONS

No.	Cipher for Iron Wheel Trucks.	Description.	Weight lbs.	Length of Handles.	Diameter of Wheels	Width.	One dozen Packed for Export Measure.	*Price Each with Rubbered Wheels	Price Each with Iron Wheels
34 W	Fagot	Two Straps in Center....Fig. 33....	180	62-in.	10½-in	24-in.	24 cu. ft	$36 60	$20 00
44 W	False	One Middle Strap ... Welded to Nose, Fig. 32.	135	62-in.	10½-in	24-in.	26 cu. ft.	38 00	22 00
14 W	Fastidious	One Middle Strap ... Welded to Nose, Fig. 32.	150	62 in.	12-in	24-in.	30 cu. ft.	42 00	24 00

STEEL NOSE

EXTRA HEAVY, FULL BOUND.

BARREL TRUCKS

With Best Iron Cross-Bars.

COTTON TRUCKS

Western Pattern.

DIMENSIONS.

No.	Cipher for Iron Wheel Trucks.	Description.	Weight lbs.	Length of Handles, Inches.	Diameter of Wheels Inches.	Width at Nose, Inches.	One Doz Packed for Export Measure About.	*Price Each with Rubbered Wheels.	Price Each with Iron Wheels.
71 W	Festoon.	Full Bound, Fig. 34.....	50	48	7½	19	13 cu. ft.	$17 00	$9 00
72 W	Feudal	Full Bound, Fig. 34.....	75	52	8½	20	16 cu. ft.	20 00	11 00
73 W	Finger	Full Bound, Fig. 34.....	90	56	9½	22	18 cu. ft.	28 50	16 00
24 C	Aggress	Full Bound, Fig. 43.....	125	62	12	24	24 cu. ft.	28 00	20 00
25 C	Acorn	Full Bound, Fig. 43.....	130	62	14	21	26 cu. ft.	40 00	24 00

BAG TRUCK

With Stamped Steel Nose.

The ordinary Bag Truck of this style is made with nose of cast iron; as they must be light the noses are very easily broken, being often broken in shipping.

At considerable expense we have put in special machinery for stamping the noses of these Trucks from a *solid piece of steel* making the nose the strongest part of the truck. Our customers, we feel sure, will appreciate the fact that for this reason these trucks are superior to any other bag trucks made. They are so cheap that every farmer should have one, and by a little push on the part of the dealer a large number can be disposed of.

Turned bearings, length, 42 inches, width at nose, 11½ inches, diameter of wheels, 6 inches; weight each, 19 lbs.; packed for export measure, 6 cubic feet per dozen.

Cipher (with iron wheels), Adverb.

Price each, with rubbered wheels..... $8.00
Price each, with iron wheels..... 4.50

COMMON PLATFORM TRUCKS.

No.	Cipher.	Fig.	Size of Platform.	Diameter of Wheels, Inches.	Weight Each, lbs.	Price Each.
80	Cavel	70	3 ft. x 3 ft.	7½	90	$13 00
82	Gaudy	70	3 ft. 4 in. x 3 ft. 4 in.	7½	115	14 00
83	Gesture	70	3 ft. 6 in. x 3 ft. 6 in.	7½	125	15 00
84	Garter	70	4 ft. x 4 ft.	8½	150	17 00

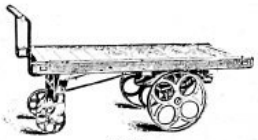


Fig. 40.

THE REYNOLDS IMPROVED TRUCK

For Mill, Factory, and Warehouse.

SIZES OF REYNOLDS IMPROVED TRUCKS KEPT IN STOCK.

Any Size Made to Order.

No.	Cipher.	Size of Platform, in feet.	Size Over all in Feet	Diameter of Wheels, Inches.	Diameter of Casters, Inches.	Capacity in lbs.	Weight, lbs.	Price, Each.
0	Madam	2 x 3	2 x 3½	12	6	1,200	120	$24 00
1	Madcap	2 x 4	2 x 4½	12	6	1,200	135	25 00
2	Madder	2½ x 4	2½ x 4½	12	6	1,200	145	26 10
4	Margo	2 x 5	2 x 5½	12	6	1,200	145	26 10
5	Mastiff	3 x 4	3 x 4½	12	6	1,200	155	27 00
6	Maxwa	2½ x 5	2½ x 5½	12	6	1,200	157	27 00
7	Magic	3 x 5	3 x 5½	12	6	1,200	162	29 25
8	9	Major	2 x 4	2 x 4½	18	9	3,000	200	30 00
9	11	Malbett	2½ x 4	2½ x 4½	18	9	3,000	220	31 50
10	12	Marconi	2½ x 4½	2½ x 4½	18	9	3,000	225	32 25
11	15	Marvel	3 x 4	3 x 4½	18	9	3,000	230	33 00
12	16	Martin	2½ x 5	2½ x 5½	18	9	3,000	230	33 00
13	18	Maybid	2 x 5	2 x 5½	18	9	3,000	229	82 25
14	19	Mersel	2 x 6	2 x 6½	18	9	3,000	230	33 00
15	20	Mosaic	2½ x 6	2½ x 6½	18	9	3,000	235	34 50
16	21	Modsty	3 x 5	3 x 5½	18	9	3,000	240	35 25
17	22	Monstur	3 x 6	3 x 6½	18	9	3,000	250	36 60
18	23	Martyr	3 x 8	3 x 8½	18	9	3,000	275	40 03

FACE OF WHEELS AND CASTERS.

Trucks numbered 0 to 8 inclusive have casters with 1¼ inch tread, wheels 2 inch tread.

Trucks numbered 9 to 23 inclusive have casters with 1¼ inch tread, wheels 2½ inch tread.

Trucks numbered 9 to 23 inclusive, with extra heavy casters with 2½ inch tread, wheels 3½ inch tread, are $2 extra per truck advance on above prices.

RUBBER TIRED WHEELS.

Trucks numbered 0 to 8 inclusive, with grooved wheels and casters, with round rubber tires sprung into groove. Price $8 extra per truck.

Trucks numbered 0 to 8 inclusive, with patent rubber tired wheels and casters. Price $12 extra per truck.

Trucks numbered 9 to 23 inclusive, with patent rubber tired wheels and casters. Price $24 extra per truck.

Fig. 98.

TIMBER DOLLIES.

For moving heavy timbers. A very useful article in sawmills, or wherever heavy stocks are handled. Made of oak or hickory, with roller of cast iron. Wrought axle passes entirely through roller. The truck forms a roller when bottom side up.

No.	Cipher.	Fig.	Frame.	Roller.	Weight lbs.	Price Each.
1	Guzzle	98	10 x 19 in.	6 x 10 in.	70	$7 50
2	Gullett	98	19½ x 26 in.	6 x 12 in.	80	10 00
3	Gelatine		18 x 24 in.	3 x 12 in.	45	5 00

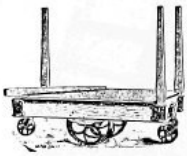


Fig. 95.

Fig. 170.

FURNITURE TRUCK.

Made of hard wood *for heavy work in wood working plants.* Sides of 2-inch hard wood dressed. Stakes of rock elm, oak or hickory. Platform of 1-inch maple or oak dressed. Turned bearings. Truck furnished with either adjustable or stationary end racks (Fig. 170) when desired.

Cipher.	Width of Truck.	Length Between Stakes.	Diameter of Wheels.	Diameter of Casters.	Weight lbs.	Price with stakes. Per Doz.	Price with end racks. Per Doz.	Iron Work only. Per Doz.
No. 1, Gangway	2 ft.	4 ft.	12 in.	7 in.	140	$130 00	$166 60	$84 00
" 2, Gainsay	2 ft.	4 ft.	16 in.	7 in.	170	144 00	180 60	96 00
" 3, Gallery	3 ft.	5 ft.	12 in.	7 in.	195	154 00	190 60	99 00
" 4, Gallop	3 ft.	5 ft.	16 in.	7 in.	215	168 00	204 60	106 00

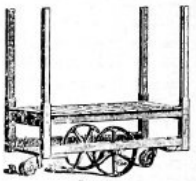


Fig. 80.

COMMON FACTORY TRUCK.

Designed for Light Trucking About Wood Working Factories.

The following sizes are kept in stock

No.	Cipher.	Dimensions of Truck.	Diameter of Wheels.	Diameter of Casters.	Price Per Dozen.	Iron Work Only. Per Dozen
1	Grandson	1½ x 3 ft.	8 in.	4 in.	$100 00	$72 00
2	Granger	2 x 4 ft.	12 in.	4 in.	120 00	84 00

Fig. 360.

HARDWARE TRUCK.

Almost every hardware or dry goods house can use one or more of these trucks to advantage. They are a necessity in most stores, and are also used largely by printers, binders, etc. The end gates are removable. We carry them in stock, size 36 x 24 x 23 inches deep, mounted on 1 inch axle, with 6 inch main wheels and 4-inch swivels at ends.

Cipher, Holly. Price, each, $8 00

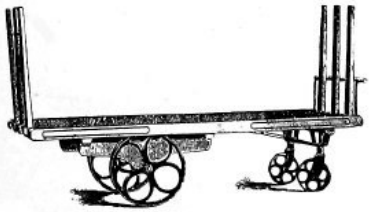


Fig. 81

REYNOLDS IMPROVED DEPOT TRUCK.

No.	Cipher.	Size of Platform. Feet.	Diameter of Wheels. Inches.	Diameter of Casters. Inches.	Weight Each. Lbs.	Price. Each.
39	Goldleaf	2½ x 5	24	12	400	$40 00
44	Gosling	3 x 8	24	12	500	51 00
45	Granite	3 x 10	24	12	550	57 00
26	Gravel	4 x 10	24	12	600	63 00

With patent rubber tired wheels (see page 122).
24-inch wheels and 12-inch casters, $60.00 extra per truck.
30-inch wheels and 16-inch casters, $85.00 extra per truck.

Fig. 84

CURVED PATTERN BAGGAGE BARROW.

No.	Cipher.	Fig.	Size. Feet.	Diameter of Wheels. Inches.	Weight. Lbs.	Price. Each.
1	Gawky	84	2 x 7	20	270	$35 00
2	Gazette	84	2½ x 10	20	300	42 00
4	Grammar	84	2 5-6 x 9½	30	370	60 00

Fig. 100

FOWL'S BAGGAGE BARROW.

A strong, well made baggage barrow. Diameter of wheels, 22 inches. Length over all, 10 feet 4 inches. Length of upright or front, 52 inches. Extreme height of front from ground, 47½ inches. Weight, each, 325 lbs.

Cipher, Fowl. Price, each, $45 00.

Fig. 82

BAGGAGE BARROW.

These barrows are made of choice hickory or oak, are heavily braced and warranted equal in quality to any similar barrows made.
Wheels are solid gray iron bored for axles and axles are turned.

No.	Code.	Size. Feet.	Diameter of Wheels. Inches.	Tread of Wheels. Inches.	Weight. Lbs.	Price. Each.
1	Glowing	2 x 7	18	2¼	215	$35 00
2	Glassy	2½ x 8½	20	3¼	280	40 00
3	Gallows	2½ x 10	20	3¼	340	45 00

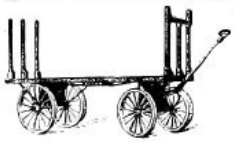


Fig. 80

RAILROAD AND EXPRESS WAGON.

Size, 1.—These are the Standard Express Trucks, same as used by the American Express Co. They are heavily ironed and well made from steel and iron and selected hard wood. With 20-inch fifth wheel. Front wheels 28 inches in diameter. Rear wheels 31 inches in diameter. Platform 35 inches high, 40 inches wide and 10 feet long. Nicely painted red and green and varnished. Furnished with American pattern wood wheels, steel wheels, or Sarven patent wheels as desired.

Code, Gender; with American pattern wood wheel, weight 650 lbs. Price each, $100 00
Code, General; with steel wheels, weight 700 lbs. " " 105 00
Code, Genius; with Sarven wheels, weight 650 lbs. " " 110 00

Size 2.—This wagon is designed to meet the want of a smaller size than No. 1. Just the truck for small passenger stations. Well painted and varnished. With 20-inch wrought spoke wheels. Platform 24 x 7 feet. All bearings turned. Weight about 450 lbs.

Code, Giszard. Price each, $80 00.

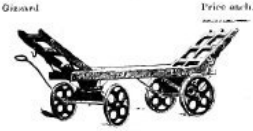


Fig. 83

OPEN BOTTOM BAGGAGE WAGON.

No.	Cipher.	Fig.	Size. Feet.	Diameter of Wheels. Inches.	Length of Bash. Inches.	Weight. Lbs.	Price. Each.
1	Gaslight	83	2 x 7	18	28	400	$50 00
2	Gateway	83	2½ x 10	18	35	550	60 00
3	Gathering	83	2½ x 12	18	44	650	70 00

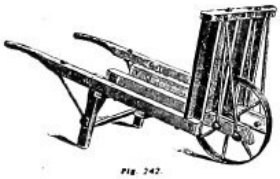


Fig. 242.

HEAVY BRICK YARD BARROW.

For brick and tile yards, and especially for handling green brick. The strongest brick barrow made. Made of best selected rock elm, hickory, or white oak lumber. Made also with closed bottom when so ordered. Painted brown.

With heavy wood wheel, 1¾-inch tread,... $96.00 per dozen.
With iron wheel, ... 104.00 per dozen
Cipher, for open bottom, wood wheel, Passage.

Fig. 235.

SPRING BRICK OR TILE BARROW

Made of rock elm, hickory or white oak. Platform 24 x 40 inches. Steel wheel.

Cipher, Pastime. Price, per doz., $168.00.

Fig. 223.

PIG METAL OR CASTING BARROW

A very strong, well made barrow. Bottom and front of 1¼-inch hard wood, dressed and well strapped with No. 10 steel. Painted brown. Weight, 98 lbs. each.

With Lanning Iron Hub Wheel, Cipher, Payday ..$52.00 per doz.

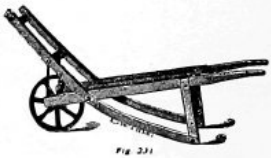


Fig. 231.

BENT BRACE STAVE BARROW

Designed for carrying wood, staves, or light boxes. Weight, each, 85 lbs. Average width 24 inches.

With 25 lb. iron wheel, 18 inches diameter, Cipher, Partner, $96.00 per doz.

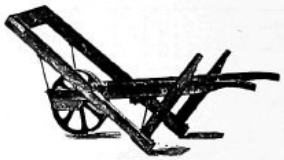


Fig. 239.

EXTRA HEAVY STAVE BOLT BARROW.

Made of selected hickory, rock elm or white oak. Well ironed, braced and bolted. Oiled and varnished. Weight, each, 106 pounds. Average width, 27 inches.

With heavy 26-inch iron wheel, or heavy wood wheel....$120.00 per doz.
Cipher, Particle

With Two Iron Wheels.

Cipher, Pencil Price, per dozen, $150.00.

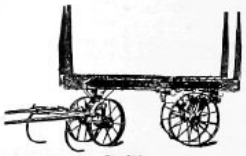


Fig. 240.

STAVE WAGON.

This wagon is designed for hauling staves or other material. Regular size, 2½ x 8 feet, with 24 and 30-inch heavy iron wheels with 3-inch tread. The shafts are adjusted to the wagon in a moment, and but one pair is needed for several wagons. As shown in cut, there are runners on shafts to prevent their catching in the ground when being hauled from one wagon to another. The wagons are made with open or closed bottoms as desired, and are very strongly ironed. Weight, 520 lbs.

With shafts, Cipher, Tomcat ..... $60 00 each.
Without shafts, Cipher, Tomcatter ..... 60 00 each.
Write for discounts.

COMMON BOLTED BARROW.

Common size, bent tray, planed on both sides. Legs bolted to handles and well braced.

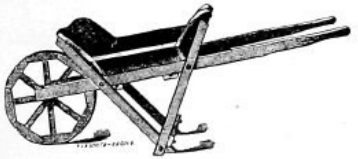
With improved 16-inch sectional felloe wheel, Cipher, Packet, $25 00 per doz.
With Patent steel wheel, Cipher, Peacock, ... 28 00 per doz.

CLIMAX BOLTED BARROW.

With Wood Wheel.

The Climax Barrow has a full size tray, with edges shaved, bolted to legs, and well bolted and braced in front. Legs gained and bolted to handles. Handles and legs of selected hard wood. Wheels painted.

With improved 16-inch sectional felloe wheel, Cipher, Paddle..$30 00 per doz.
With Lansing 18-inch iron hub wheel, Cipher, Potato..... 31 50 per doz.
With steel wheel, Cipher, Pedler..... 38 00 per doz.



LANSING PATENT BOLTED CANAL BARROW.

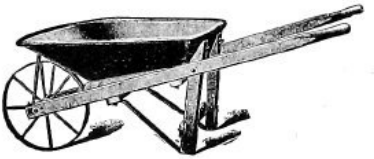
Full size tray, well bolted in front and back. Handles and legs of selected hard wood, well planed and bolted, making a strong barrow.

With 18-inch sectional felloe wheel, Cipher, Painless..... $32 00 per doz.
With steel wheel, Cipher, Penny..... 35 00 per doz.

CLIMAX BARROW.

With Wired Edge Steel Tray.

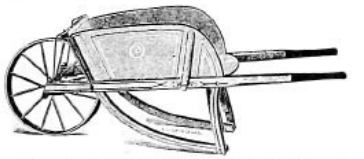
No.	Cipher.	One Dozen Packed for Export Measure.	Diameter of Wheel, Inches.	Gauge of Steel in Tray	Size at Top.	Weight each, Pounds.	Price per Dozen.
B 1	Seagrass	21 cu. ft.	17	16	28 in. long, 31 in. wide	55	$60 00
B 2	Seaman	21 cu. ft.	17	14	28 in. long, 31 in. wide	60	66 00



CLIMAX BARROW.

With Wired Edge Steel Tray.

No.	Cipher.	One Dozen Packed for Export Measure.	Diameter of Wheel, Inches.	Gauge of Steel in Tray	Size at Top, Inches.	Capacity in Cubic Feet.	Weight each, lbs.	Price per Dozen.
C 3	Seamark	24 cu. ft.	17	16	33 long, 37 wide	3	55	$66 00
C 4	Seamster	24 cu. ft.	17	14	33 long, 37 wide	3	65	72 00
C 5	Semitone	26 cu. ft.	17	14	37 long, 31 wide	4	70	78 00

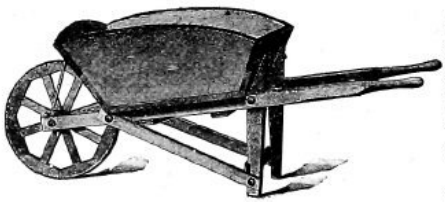


THE GLOBE PATENT GARDEN BARROW.

With Steel Wheel.

No.	Box.	Weight.	Price per Dozen.
3	28x17	40 lbs.	$57 00
2	30x19	44 "	61 00
1	32x22	48 "	65 00

MORTAR WHEELBARROW.



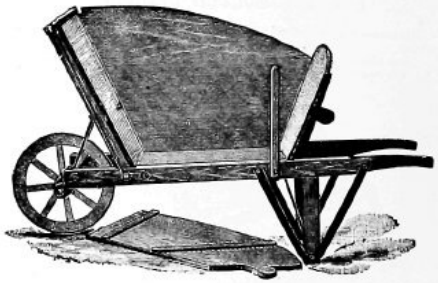
Tight box for wheeling mortar. Top iron banded. Iron braced and well bolted. Size of box at top, 29 inches wide at wheel, and 26 inches wide at handles, 32 inches long. Size of box at bottom, 19 inches wide, 20 inches long. Box 14 inches deep at wheel, 8 inches deep at handles. Weight per dozen, 720 lbs.

With Lansing 18 inch iron hub wheel, per doz.....$48 00
With heavy iron wheel.....per doz., 51 00

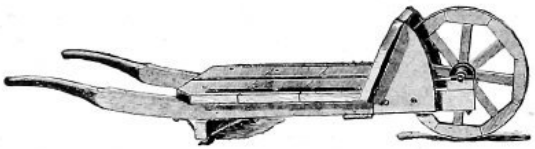
SAW DUST OR SHAVING BARROW.

Size of box at top, 28 inches wide at wheel, 32 inches wide at handle, 46 inches from front to back. Size of box at bottom, 17½ inches wide at wheel, 22 inches wide at handle, 24 inches from front to back. 28 inches deep at wheel, 19 inches deep at handles. Weight, each, 100 lbs.

With heavy wood wheel..per doz., $144 00



BENT HANDLE STONE BARROW.

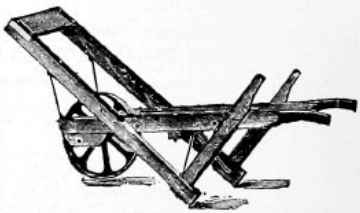


Size of bottom, 28 inches wide, 27 inches long and 11 inches high in front. Handles 2x3 inches, dressed, made of oak, rock elm or hickory. Weight, 70 lbs. each.

With Lansing iron hub wheel, extra heavy.....per doz., $60 00
" heavy steel wheel..... " 63 00

EXTRA HEAVY STAVE BOLT BARROW.

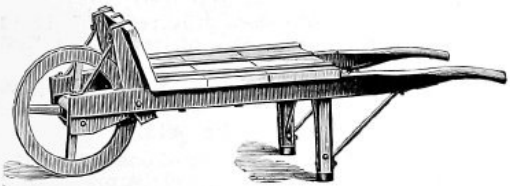
With heavy 20 inch iron wheel, or heavy wood wheel.....per doz., $120 00
Weight, each, 106 lbs.



BENT BRACE STAVE BARROW.

Designed for carrying wood, staves, or light boxes. Weight, each, 85 lbs. Average width 24 inches.
With 25 lb. iron wheel, 18 inches diameter, per doz.....$96 00

HAND MADE PIG IRON BARROW.



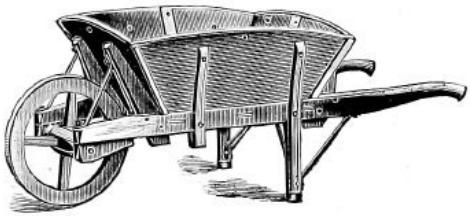
Size of bottom, 3 feet long by 2 feet wide, 8½ inches high in front, bottom 1¼ inches thick. Handles made of 2x3 inch white oak or hickory. Wheel very heavy, diameter 19 inches, tread 1¾ inches, tire ¼ inch thick. Iron bands on ends of legs. Weight of barrow 95 lbs.

Price.....each, $8 00

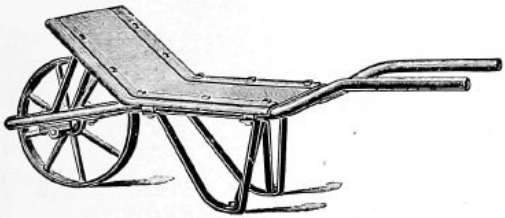
HAND MADE SCRAP IRON BARROW.

Handles are made of 2x3 inch white oak; box is made of 1¼ inch maple. Size of box at top 26 inches wide at wheel end, 30 inches wide at handle end, 34 inches long. Has a heavy wheel 19 inches in diameter, 1¾ inch tread, and has ¼ inch tire. Weight of barrow is 130 lbs.

Price.....each, $10 00



STEEL PIG IRON OR INGOT BARROW.



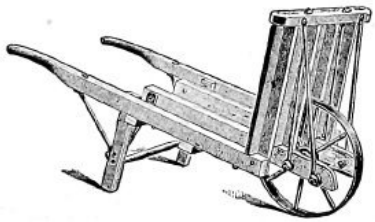
Wheels are 17 inches in diameter. Tires are 1¾ inches wide. The bed and dash of barrow are of No. 10 steel. Size of bed 22x24 inches, dash 18 inches high. We furnish this barrow with two wheels when desired at an additional price. Weight of barrow 110 lbs.

Price.....each, $24 00

HEAVY BRICK YARD BARROW.

For brick and tile yards, and especially for handling green brick. The strongest brick barrow made. Made of best selected rock elm, hickory, or white oak lumber. Made also with closed bottom when so ordered. Painted brown.

With heavy wood wheel, 1¾ inch tread, per dozen.....$ 96 00
With iron wheel.....per doz., 104 00



TUBULAR STEEL MINING BARROW.

No. A2.

Weighs about 70 lbs.; capacity about 3 cubic feet. Size of tray on top 27x33 inches.

Price.....each, $12 00

No. A13.

The tray is made of one piece of No. 13 steel. Capacity of barrow about 3 cubic feet. Weight, 75 lbs. Size of tray on top, 27x33 inches.

No. A13. Price .....each, $13 00

No. A14.

Same size and style as above except with tray made of No. 12 steel, weight about 90 lbs.

Price.....each, $15 00

STEEL TUBULAR COAL BARROW.

No. A15.

These barrows have larger trays than the A2, A13 and A14 barrows, being designed more especially for coal, the capacity being about 270 lbs. of coal.

Nos. A16 and A17.

Designed especially for use in foundries, machine shops and other places where a large, heavy, very strong barrow is wanted.

No.	Packed for Export, 1 doz. measure.	Size of Tray on Top.	Diameter of Wheel.	Gauge of Steel in Tray.	Capacity.	Weight.	Price Each.
A15	30 ft.	30x38 in.	17 in.	14	4½ ft.	86 lbs.	$15 00
A16	30 "	30x38 "	17 "	12	4½ "	95 "	18 00
A17	30 "	30x38 "	17 "	10	4½ "	110 "	20 00

TUBULAR STEEL COKE BARROW.

These barrows have very large trays, capacity about 210 lbs. coke or 370 lbs. coal. They are strongly made and well braced and thoroughly painted. Wheels revolve on a heavy bolt which also passes through the handles and so materially strengthens the barrow. The edges of the trays are flanged and turned over a ⅝ inch steel rod. This rod prevents the tray from breaking at the edge and makes it very much stronger.

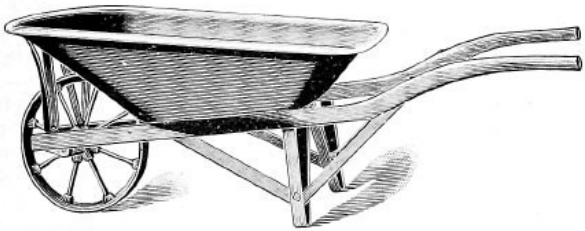
No.	Size at Top.	Diameter.	Gauge of Steel in Tray.	Capacity.	Weight Each.	Price.
A18	33x42 in.	17 in.	14	370 lbs. coal.	100 lbs.	$20 00
A18½	33x42 "	17 "	16	370 " "	90 "	19 00
A19	38x50 "	17 "	16	350 " coke.	100 "	24 00

STEEL BARROWS.

MINING BARROWS.

No.	Capacity.	Tray.	Handles.	Weight.	Price.
A1	3 cubic feet	No. 15	No. 12	68 lbs.	$11 50
A2	3 " "	" 14	" 12	74 "	12 00
A3	3 " "	" 13	" 12	80 "	12 50
A4	3 " "	" 12	" 10	86 "	14 00
A5	4 " "	" 12	" 10	92 "	15 00

Wheels, 16 inches diameter.

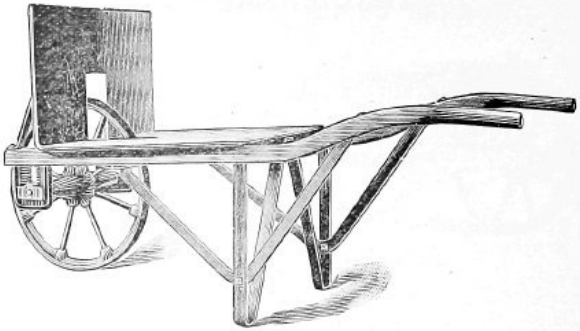


COAL BARROWS.

No.	Capacity.	Tray.	Handles.	Weight.	Price.
B1	200 lbs.	No. 14	No. 12	78 lbs.	$14 50
B2	250 "	" 14	" 12	84 "	15 00
B3	325 "	" 14	" 12	90 "	16 00
B3½	325 "	" 12	" 10	105 "	20 00
B4	400 "	" 11	" 10	130 "	22 00

Wheels, 16 inches diameter.

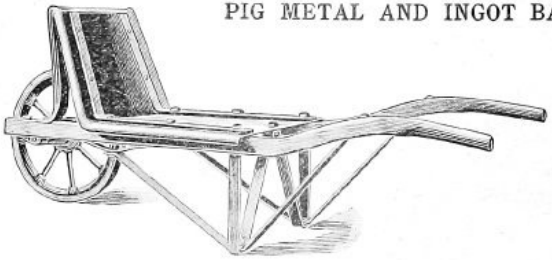
STEEL BARROWS.



BRICK BARROWS.

No.		Bed.	Handles.	Wheels.	Weight.	Price.
1	Solid Bed, Rigid Bearings	No. 14	No. 10	16 in. diam.	95 lbs.	$14 00
2	Open " " "	" 14	" 10	20 " "	115 "	17 00
3	" " Spring "	" 14	" 10	20 " "	135 "	20 00

PIG METAL AND INGOT BARROW.



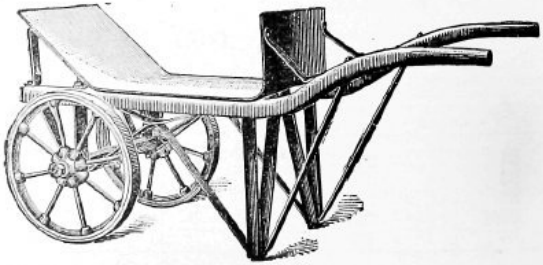
C No. 1, bed No. 12, handles No. 10, weight 120 lbs., price $18.00.

Wheel, 16 inches diameter, extra heavy. Suspension braces. Bed, front and front braces of one plate. Largely used, and has no equal.

PIG METAL AND INGOT BARROW.

C No. 2, bed No. 4, handles No. 10, weight 120 lbs., price $30.00.

Wheels, 16 inches diameter, extra heavy. Suspension braces. Bed, front and back of one plate, 14 inches wide.



COAL BARROW WITH TWO WHEELS.

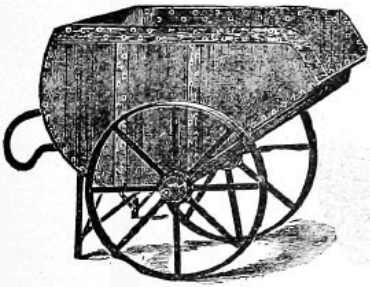
Made of steel, banded around top, well painted.

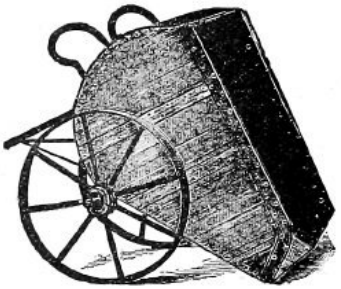
These Barrows are easily dumped forward without running back onto the operator. Axles have turned bearings. Wheels bored true to size.

No.	Weight Each, lbs.	Fig.	Size of Tray at Top.	Diameter of Wheels, inches.	Gauge of Steel in Box.	Capacity in lbs. of Coal.	Price Each.
D 1	175	256	23x33	16	12	250	$25 00
D 2	185	256	24x35	16	12	350	27 00
D 3	220	256	26x38	18	12	400	30 00
D 4	240	256	27x40	18	12	500	32 00

CHARGING BARROW.

For Charging Blast Furnaces or Gas Retorts.

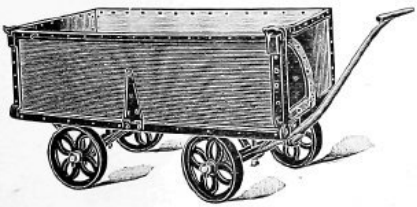




No.	Weight Each.	Width, inches.	Depth, inches.	Length, inches.	Diameter of Wheels, inches.	Capacity, cubic feet.	Price Each.
1	325	20	21½	54	30	10	$75 00
3	375	24	26	54	30	14	83 00
5	450	28	30	57	30	20	90 00

Charging Barrows of other sizes made to order.

If desired these Barrows can be furnished with third wheel in place of legs. Price same as above.

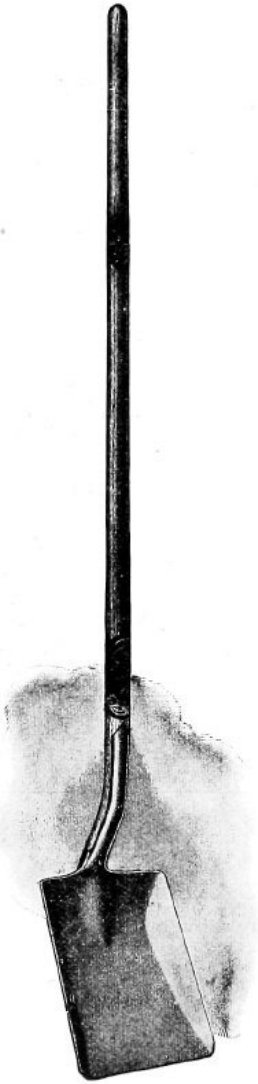


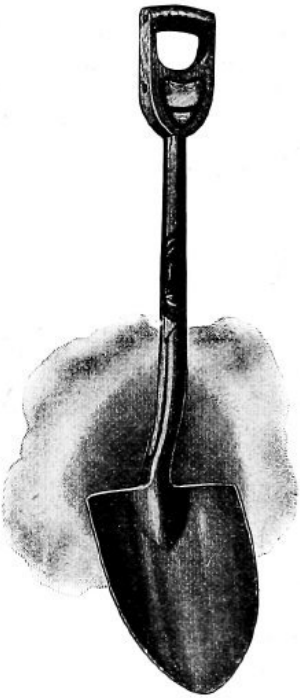
COAL TRUCKS.

These Trucks are made any size to order. Trucks 5 feet x 34 inches; 18 inches deep, to carry 1,000 lbs. coal. Wheels 14 inches in diameter. Hinges and side-board irons are malleable; the only cast iron about the car being the wheels.

Price.....each, $100 00

"ZELNICKER" SHOVELS.





We make a

SPECIALTY of

HIGH GRADE Shovels

for ALL purposes.

PLAIN BACK SHOVELS.

"D" Handle, Square Point.

"D" Handle, Round Point.

Malleable "D."

Long Handle, Square Point.

ZELNICKER BLACK.

	Per doz., list.
No. 2. "D" handle, square point	$15 00
No. 2. "D" handle, round point	15 00
No. 2. Long handle, square point	15 00
No. 2. Long handle, round point	15 00
No. 2. Railroad Tamping, Malleable "D"	17 00

Polished, add 75 cents per dozen to list price.

Long Handle, Round Point.

HOLLOW BACK SHOVELS.

"D" Handle, Square Point.

"D" Handle, Round Point.

Moulders' Shovels.

Long Handle, Square Point.

W. A. Z. BLACK.

	Per doz.
No. 2. "D" handle, square point	$12 00
No. 2. "D" handle, round point	12 00
No. 2. Long handle, square point	12 00
No. 2. Long handle, round point	12 00
No. 2. Railroad Tamping, Malleable "D"	14 00

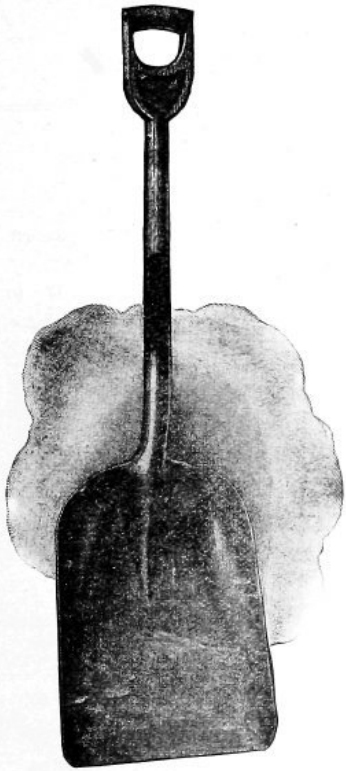
Polished, add 75 cents per dozen to list price.

MOULDERS' SHOVELS, PLAIN BACK.

	Per doz.
No. 2. Zelnicker polished, "D" handle moulders'	$16 00
No. 2. W. A. Z. polished, "D" handle moulders'	13 50

Long Handle, Round Point.

HOLLOW BACK SCOOPS.

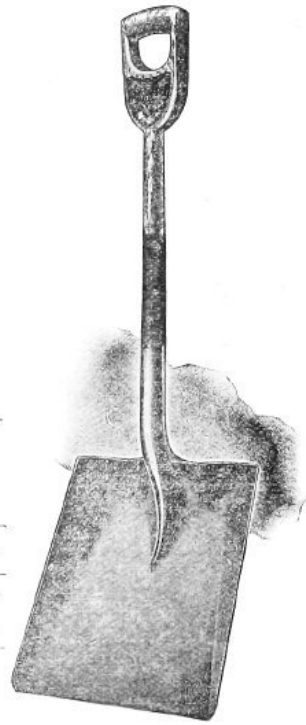


EASTERN PATTERN LOCOMOTIVE AND COAL SCOOPS.

W. A. Z. GRADE. Black. Size.	List, Per Doz.	DIMENSIONS. Width.	Length.
2	$14 00	11 in.	15 in.
3	14 50	11¼ "	15½ "
4	15 00	11½ "	16 "
5	15 50	12 "	16½ "
6	16 00	12¾ "	17 "
7	16 50	13¼ "	17 "
8	17 00	13⅜ "	17¼ "

Half polished, add 50 cents per dozen to list price.

Full polished, add 75 cents per dozen to list price.

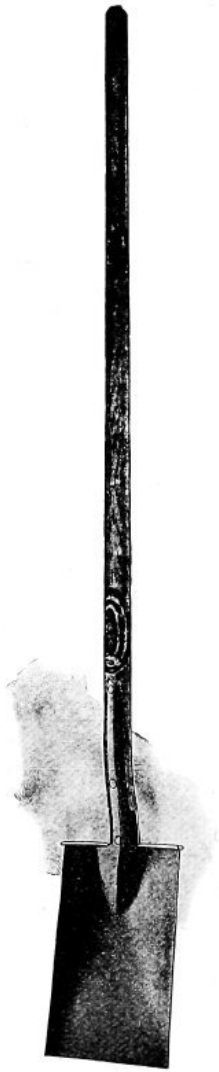


HOLLOW BACK COAL SHOVELS.

ZELNICKER GRADE. Black. Size.	List, Per Doz.	W. A. Z. GRADE. Black. Size.	List, Per Doz.	DIMENSIONS. Size.	Width.	Length.
1	$17 00	1	$14 50	1	13½ in.	14 in.
2	17 50	2	15 00	2	14¼ "	14½ "
3	18 00	3	15 50	3	14¾ "	15 "

Half polished, add 50 cents per dozen to net price.
Full " " 70 " " " " "

PLAIN BACK SPADES.



"D" or Long Handle.

ZELNICKER GRADE.		W. A. Z. GRADE.		DIMENSIONS.		
Black.		Black.				
Size.	List, per doz.	Size.	List, per doz.	Size.	Width.	Length.
2	$15 50	2	$13 00	2	7½x7⅛	12 in.
3	16 00	3	13 50	3	8 x7½	12¼ "

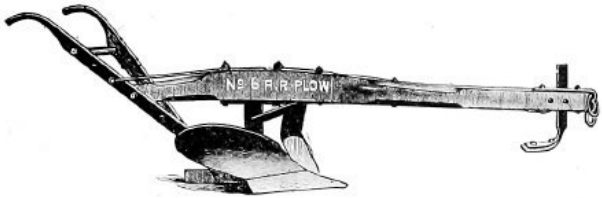
COAL FORKS.

No.	Number of Tines.	Length of Tines.	Width of Fork.	Price per doz.
610	10	15½ in.	11½ in.	$25 00
612	12	16½ "	16 "	29 00
614	14	16 "	14 "	33 00

COKE FORKS.

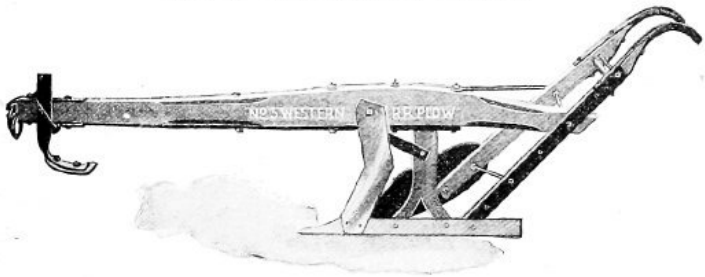
No.	Number of Tines.	Length of Tines.	Width of Fork.	Price per doz.
310	10	17 in.	14½ in.	$24 00
312	12	17½ "	18 "	28 00
314	14	18 "	20½ "	33 00
316	16	18 "	19½ "	40 00

No. 6 RAILROAD AND TOWNSHIP PLOW.



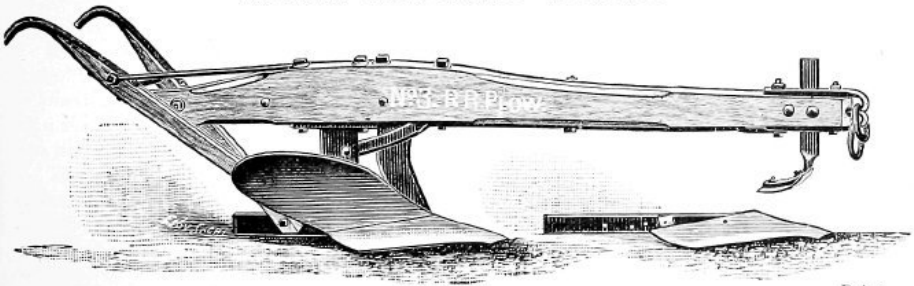
	Price
No. 6 Plow. Two-horse, 11 inch cut, with extra Share, weight 125 lbs	$25 00
Additional extra Share for above	4 00

No. 5 RAILROAD PLOW.



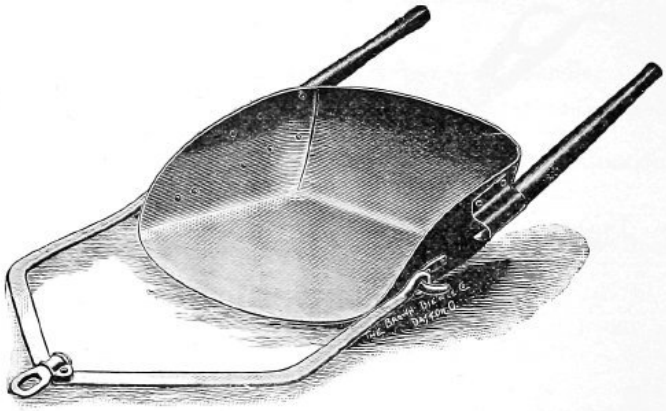
	Price.
No. 5 Plow. Four-horse, 11 inch cut, with extra Share, weight 150 lbs	$30 00
Additional extra Share for above	5 00

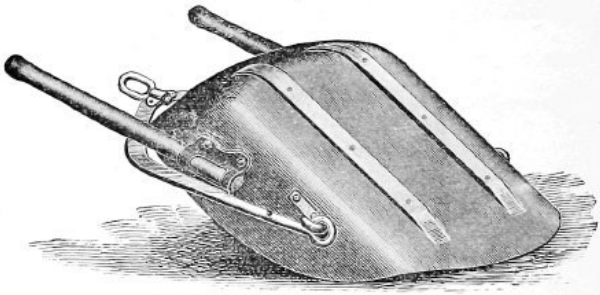
HEAVY RAILROAD PLOWS.



	Price.
No. 1 Plow. Six-horse, 12 inch cut, with extra Share, weight 230 lbs	$38 00
No. 2 " Eight " 12 " " " " " " 260 "	42 00
No. 3 " Ten " 10 " " " " " " 300 "	45 00
Extra Share for No. 1 Plow	6 00
" " " " 2 "	7 50
" " " Nos. 3 and 4 Plows	9 00

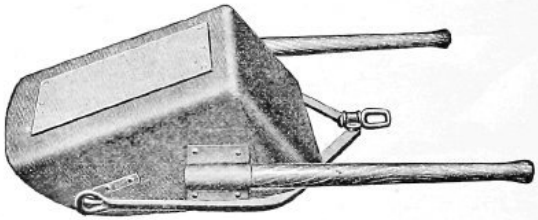
STEEL DRAG SCRAPERS.





Bottom View—Showing Runners.

CONTRACTORS' FAVORITE.



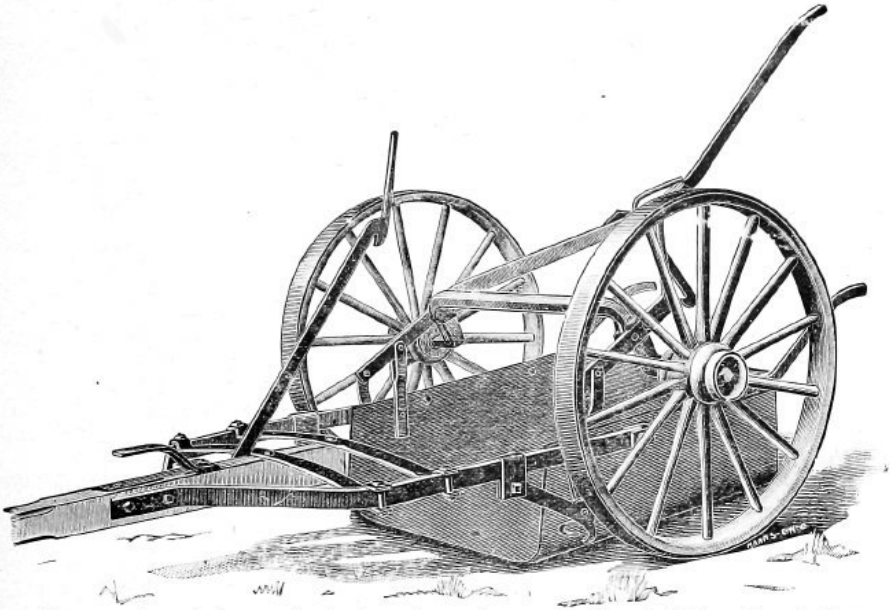
Either pattern furnished **with runners** or **without them,** or with a **broad, flat bottom plate.**

Scrapers always shipped WITH RUNNERS unless otherwise ordered.

Size	No. 1.	Capacity,	7	cubic	feet;	weight,	95 lbs.
"	No. 2.	"	5	"	"	"	85 "
"	No. 3.	"	3	"	"	"	75 "

"ZELNICKER" WHEELED SCRAPER.

Made Heavy in all Parts; Will Withstand Any Strain.



The scoop is made from a single plate of extra heavy **open hearth, high carbon steel,** the sides being extended at the rear and bent around and solidly riveted to the back, making a stronger and stiffer box than the old plan of fastening the back into the box by means of angle iron.

On these Wheeled Scrapers will be found none but the highest grade and most expensive type of the Sarven wheel—no **home-made** affair—but furnished by the best wheelmakers in America. The hub boxes are made with a cup or reservoir in the center capable of holding a week's supply of lubricant. We put a 5/16 inch steel tire on the wheels of the No. 2 size, and a 3/8 inch steel tire on the wheels of the No. 3 size.

The combination **steel** and **oak hounds** as employed by us are the most substantial arrangement ever made use of, and lend a **firmness** to the whole structure not obtained in any other manner.

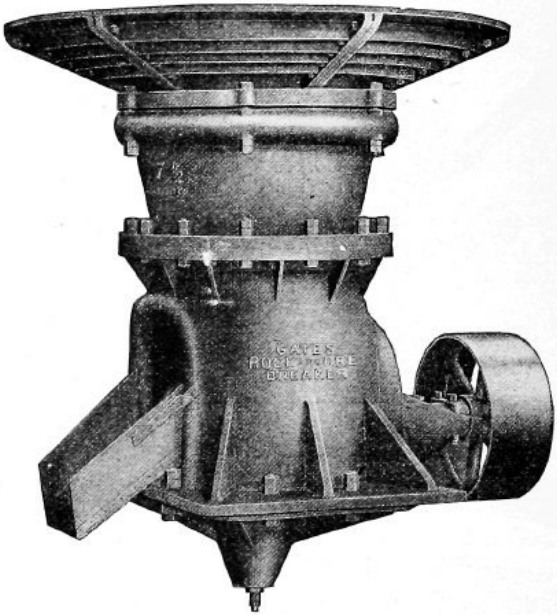
This Scraper is produced in answer to a demand for the best, and it will not disappoint our friends. All we ask is that it may be seen and tried. Made in three sizes, viz.:

No. 1. Carrying 10 cubic feet of dirt, weighing 450 lbs.
No. 2. " 13 " " " " " 650 " and with gate 700 lbs.
No. 3. " 17 " " " " " 770 " " " " 830 "

No. 3 size furnished with snatch rod. Snatch rod on Nos. 1 and 2 extra.

We do not furnish Double or Singletrees, Neck-yokes nor Stay Chains unless specially ordered and they are always charged extra.

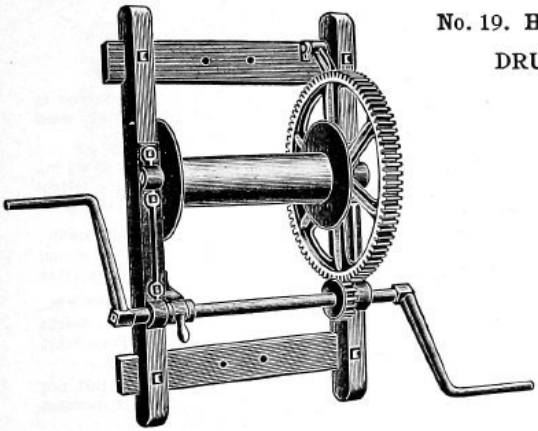
GATES ROCK AND ORE BREAKER.



NEW STYLE "D" GATES BREAKER.

Size	Dimensions of each receiving opening about	Dimensions of receiving openings combined about	Weight of breaker	Capacity per hour, in tons of 2,000 lbs., passing 2½ in. ring, according to character of rock or ore	Smallest size product can be made at one break	Dimensions of driving pulley		Revolutions of driving pulley	Size engine recommended drive breaker elevator and screen
	INCHES	INCHES	LBS.		INCH	INCHES DIAM.	INCHES FACE		Indicated horsepower
F	2x 6	2x 12	650	*	⅜	8	2⅝	700	1 to 1½
H	7x18	7x 54	11800	†	½	24	4	600	10 to 15
0D	4x15	4x 30	3550	2 to 4	⅝	16	6	500	4 to 5
1D	5x18	5x 36	5500	4 to 8	¾	20	7	475	8 to 10
2D	6x21	6x 42	8000	6 to 12	1	24	8	450	12 to 15
3D	7x22	7x 45	14000	10 to 20	1¼	28	10	425	20 to 25
4D	8x27	8x 54	21000	15 to 30	1½	32	12	400	25 to 30
5D	10x30	10x 60	30000	25 to 40	1¾	36	14	375	30 to 40
6D	11x36	11x 72	42000	30 to 60	2	40	16	350	40 to 60
7½D	14x45	14x 90	63000	75 to 125	2½	44	18	350	75 to 125
7½K	14x45	14x 90	67000	75 to 125	2½	44	18	350	75 to 125
8D	18x63	18x126	94000	125 to 200	3	48	20	350	100 to 150
8L	18x63	18x126	91500	125 to 200	3	48	20	350	100 to 150
9K	21x48	21x144	155000	300 to 500	4	56	20	300	100 to 150

HAND POWERS.



No. 19. HAND POWER WINCH, SINGLE DRUM, SINGLE PURCHASE.

Capacity for Four Men.

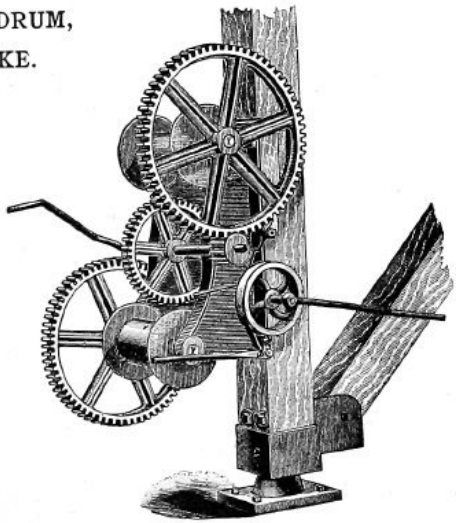
Diameter and Length of Drum.	Pull of One Man on Single Line.	Price.
4x16	600 lbs.	$23 00
4x24	600 "	25 00
6x21	500 "	25 00

No. 24. HAND POWER, DOUBLE DRUM, DOUBLE PURCHASE, WITH BRAKE.

Capacity for Four Men.

Diameter and Length of Drum.	Pull of One Man on Single Line.	Price.
6x21	3,500 lbs.	$75 00
6x26	3,500 "	80 00
9x16	3,000 "	75 00
9x21	3,000 "	80 00

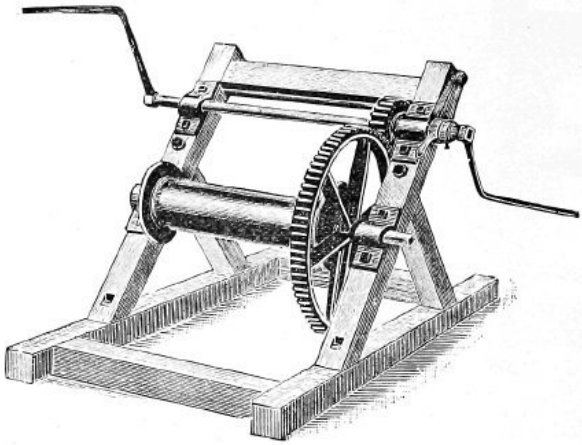
Price does not include Foot Block, Derrick Timber or Rope.



Write for Catalogues and Prices of all kinds of Hand Powers, Derricks, Derrick Fittings, Pile Drivers, etc.

INCLINED WOOD FRAME WINCH.

SINGLE GEAR.



The same machine as built on inclined wood frame.

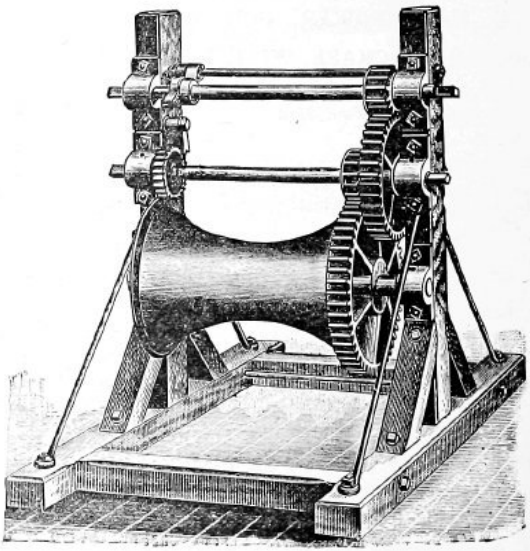
No. 110. Drums 20 x 4 in., gear 15 x 1½ in., weight 200 lbs.....Price $36.00

No. 112. Drums 20 x 6 in., gear 18 x 2 in., weight 250 lbs.....Price $40.00

No. 114. Drums 26 x 6 in., gear 24 x 2½ in., weight 400 lbs.....Price $45.00

Pawl stop supplied, not shown in the cut, included in price.

DOUBLE GEAR.



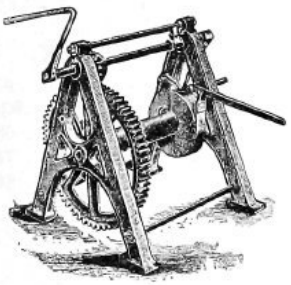
Heavy oak frame with double gear, which can be worked either single or double gear. Barrel of capstan shape, as shown, is always sent, but straight barrels can be ordered without extra charge. All barrels are of iron, 6 in. at smallest diameter.

No. 10. Drum 20 in. long, gear 15 x 1½ in., weight 250 lbs. Price..... $53.00

No. 12. Drum 20 in. long, gear 18 x 2 in., weight 350 lbs. Price..... $64.00

No. 14. Drum 20 in. long, gear 24 x 2½ in., weight 500 lbs. Price..... $85.00

SINGLE PURCHASE CARGO WINCHES OR HOISTING CRABS.



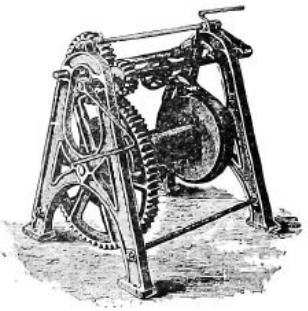
These Crabs are constructed to lift direct from the barrel the load plainly indicated on the side frames. The power is increased by the number of pulleys used in the blocks. Sides are tied together by wrought stretcher rods with solid collars inside of the frames and nuts outside. The barrel shafts are wrought iron. The barrel, brake wheel and ratchet are cast in one piece and secured to the main spur wheel by joggles fitting between the arms of the wheel. The crank shaft can be thrown out of gear when lowering with the brake, so the handles will not fly around. Can be lowered with either the brake or handles.

PRICE, WITH CAST IRON SIDES

SIZE No.	101	102	103	104
Lifts with a 2 and 3 sheave pulley block.....Tons	2	3	4	5
Lifts direct from barrel.....Cwt.	8	12	16	20
Size of barrel.....Inches	12x4½	14x4½	16x4½	18x4½
Approximate weight.....Pounds	250	280	340	365
Price, with lever brake.....Each	$31.00	33.00	38.00	42.00
Extras, if ordered, Screw brake..... "	3.50	3.50	3.50	3.50
" " Brass bushing..... "	5.50	6.50	7.00	7.50

IRON HOISTING CRABS OR CARGO WINCHES.

DOUBLE PURCHASE.

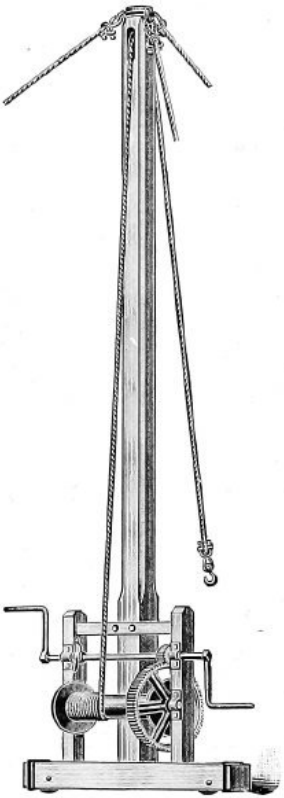


The double purchase crab is arranged with two speeds, and can be worked either single or double purchase. The crank shaft can be thrown out of gear when lowering with the brake, so the handles will not fly around. Lowering can be done either with the handles or with the brake. The power is increased or diminished by the number of pulleys used in the blocks.

PRICE, WITH WROUGHT IRON SIDES.

SIZE No.	110	111	112	113	114	115	116	117	118
Lifts with a 2 and 3 sheave pulley block.....Tons	4	5	6	7	8	10	12	15	20
Lifts direct from barrel.....Cwt.	16	20	25	30	35	40	50	60	80
Size of barrel.....Inches	16x4½	18x4½	19x5	20x5	21x6	21x6	22x7	26x8	32x8
Approximate weight.....Pounds	365	420	535	615	650	760	1120	14.60	21.60
Price, with lever brake.....E	$43.50	47.50	58.50	66.00	68.00	77.50	109.00	140.00	217.00
Extras, if ordered, Screw brake..... "	5.00	5.00	5.00	5.00	5.00	10.00	10.00	10.00	10.00
" " Brass bushing..... "	8.50	9.00	9.50	10.00	10.50	11.00	12.00	15.00	19.00

HAND POWERS.



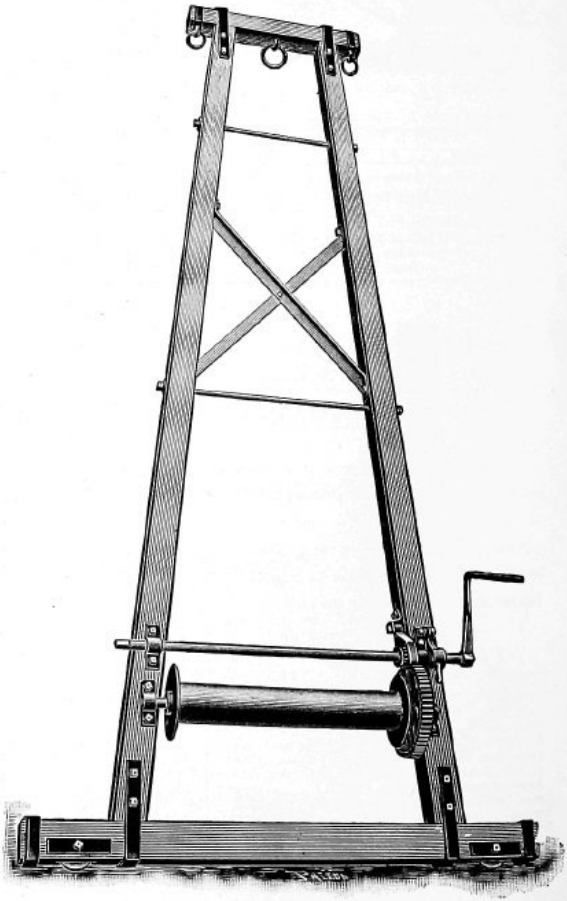
No. 28. HAND POWER, POLE DERRICK.

	Price.
Height, 16 feet	$40 00
" 20 "	44 00
" 24 "	48 00
" 28 "	54 00

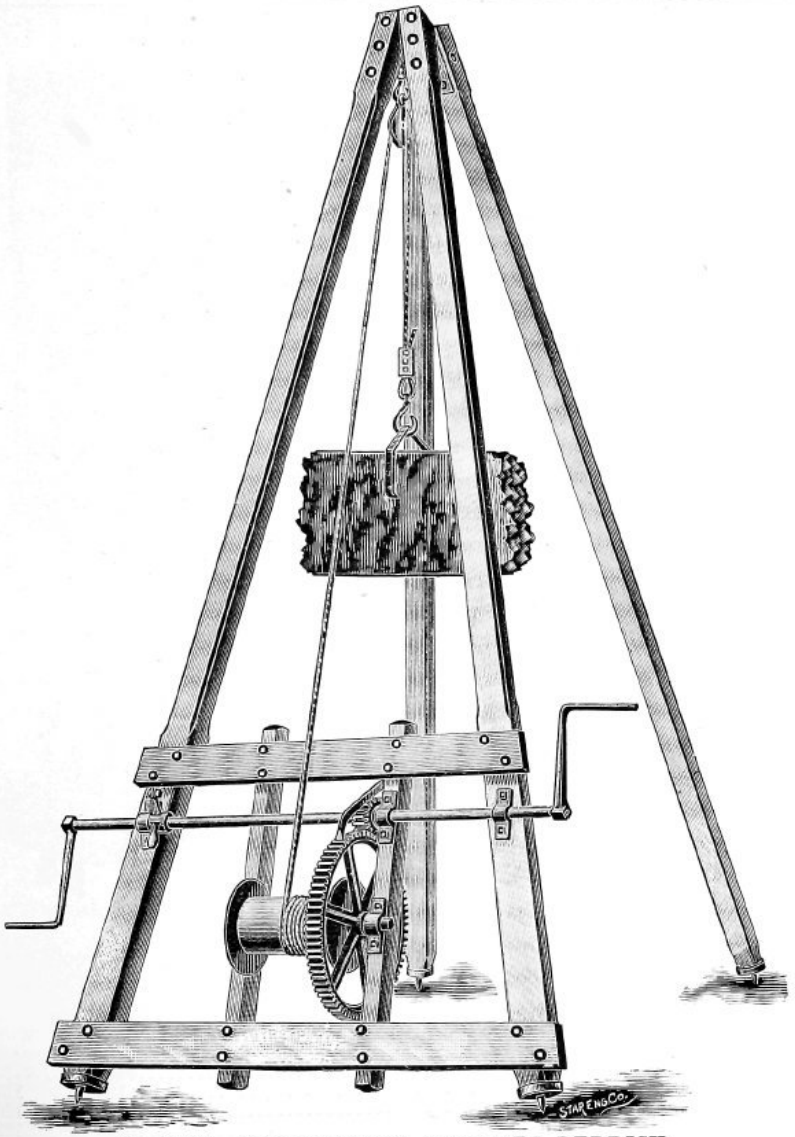
Price does not include Rope and Rope Fittings.

No. 25.
HAND POWER, BREAST DERRICK.

	Price.
Height, 16 feet	$60 00
" 20 "	66 00
" 24 "	74 00
" 28 "	84 00



No. 25.



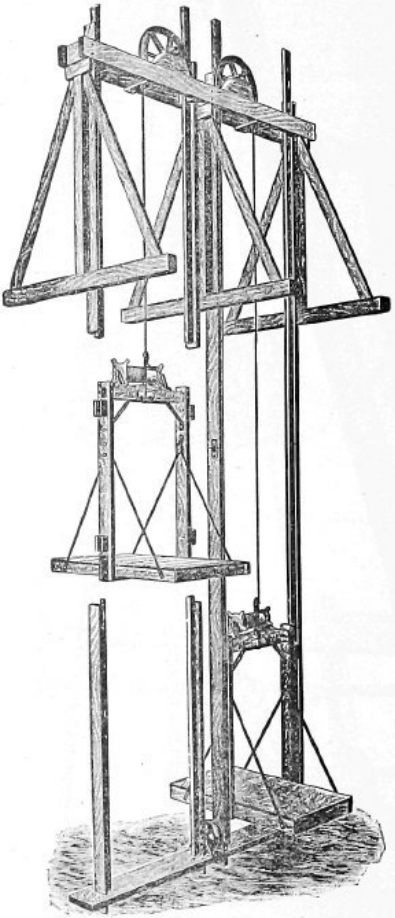
No. 27½. HAND POWER FOUR-LEG DERRICK.

Price, without rope and block, 1,000 lbs. capacity $46 00
" " " " " 3,000 " " 55 00
" " " " " 6,000 " " 65 00

We also make same style Derricks with 3 legs.

MATERIAL ELEVATOR.

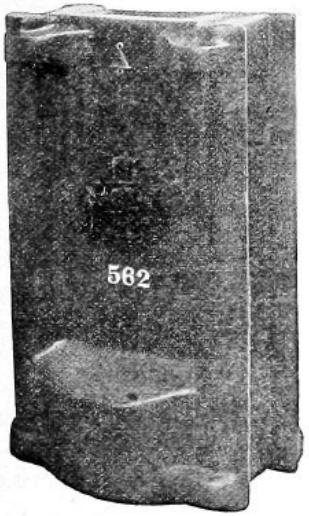
Wood Guides.



	With Guide.	Without Guide.
Price of Elevator complete, 75 foot raise	$160 00	$110 00
" " " 90 " "	170 00	115 00
" " " 105 " "	180 00	120 00
" " " 120 " "	190 00	125 00
" " " 135 " "	200 00	130 00
" " " 150 " "	210 00	135 00

A ⅜ inch 6x19 crucible steel hoisting rope is furnished with each elevator.

DROP HAMMERS.



Weight of Drop Hammer, lbs.	Distance between Jaws inches.	Width of Jaw Channel-iron Liners.	Width of Jaw with Strap Liners.
500 and 600....	13	4¼	4½
700 " 800....	14	4¼	4½
1,000	16	5¼	5½
1,200 to 1,800....	18	6¼	6½
2,000 " 2,500....	19	7¼	7½
Above 2,500.....	20	8¼	8½

NIPPERS.

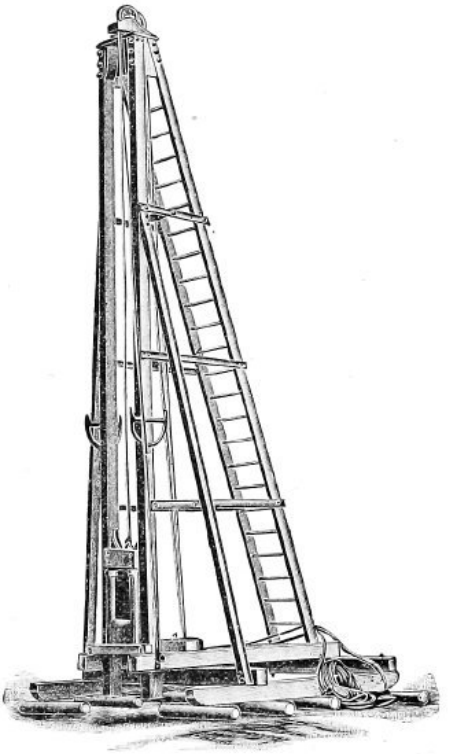
With Block.

Without Block.

No. 1 Nippers $26 00
No. 2 " 20 00
No. 3 " 16 00
No. 4 " 12 00
Nipper Blocks.....$3 00 to 3 50

No. 1 for Hammer over 2,500 lbs.
No. 2 " " " 1,500 " to 2,500 lbs.
No. 3 " " " 800 " " 1,500 "
No. 4 " " 500 lbs. to 800 lbs.

TOWNSHIP PILE DRIVERS.



For prices see page 520.

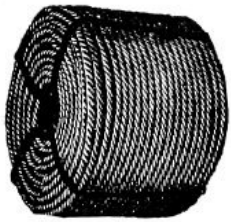
TOWNSHIP PILE DRIVERS, COMPLETE, Omitting Lines and Blocks.

Size of Driver.	Distance between Jaws.	Width of Jaw.	Hammer with Steel Die fitted in.	Forged Nippers	Two Top Sheaves, Shafts, Boxes, and Bolts.	Channel-iron Liners including Bolts and Washers	Height of Leaders.	One pair No. 1 Toggles, with Bolts.	One pair No. 2 Toggles, with Bolts.	Total price of Iron Work	Wood Work complete.	Total cost of Pile Driver without Lines and Blocks
Pounds	Inches	Inches					Feet					
500	13	4¼	$15.00	$10.50	$4.00	$13 75	26	$3.50	$1.75	$48.50	$65.00	$113.50
600	13	4¼	17 75	10.50	4.00	13.75	26	3.50	1.75	51.25	65.00	116.25
700	14	4¼	19 75	10.50	4.00	13 75	26	3.50	1.75	53.25	80.00	133.25
800	14	4¼	22.25	10.50	4.00	13.75	26	3.50	1.75	55.75	80.00	135.75
1000	16	5¼	26.50	14.00	6.00	16.00	26	5.75	2.25	70.50	85.00	155.50
1200	18	6¼	31.50	14.00	6.00	22.50	30	5.75	2 25	82.00	100.00	182.00

CONTRACTORS' PILE DRIVERS, COMPLETE, Omitting Lines and Blocks.

Size of Driver.	Distance Between Jaws	Width of Jaws	Hammer with Steel Die fitted in	Top Sheaves, Shafts, Boxes and Bolts, Solid Boxes	Bottom Sheave, Shaft Boxes and Bolts.	Height of Leaders.	Length of Channel Irons	Channel-Iron Liners, including Bolts and Washers.	One Pair No. 1 Toggles, with Lag Screws.	One Pair No. 2 Toggles with Lag Screws	Total Cost of Iron Work.	Wood Work, Complete.	Total Cost of Complete Pile Driver.
1,500 lbs	18	6¼	$36.25	$6.00	$7.25	30	27	$21.75	$8.00	$3.00	$ 82.25	$100.00	$182.25
1,800 "	18	6¼	43.00	6.00	7.25	30	27	21.75	8.00	3.00	89.00	100.00	189.00
2,000 "	19	7¼	42.50	9.00	9.50	35	32	30.75	8.00	3.00	107.75	125.00	232.75
2,500 "	19	7¼	58 75	9.00	9.50	40	37	35.50	8.00	3.00	123.75	170.00	293.75
3,000 "	20	8¼	63.00	9.00	9.50	50	47	53.50	9.25	3.60	147.85	275.00	422.85

On outfits above 3,000 pounds, prices will be given on application. When a Pile Cap is used No. 1 or No. 2 Toggles are not required. On the larger sizes of leaders freight rates are liable to be prohibitory for long distances. We prefer to furnish working drawings for woodwork, rather than make it up.



Manila and Sisal.

ROPE BASIS IS PRICE FOR ¾ INCH DIAMETER, 1¼ INCH CIRCUMFERENCE AND UPWARDS, UNTARRED.

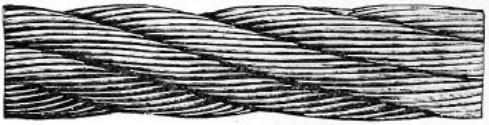
Unless otherwise stated, all quotations made are Basis price, and subject to the following variations:

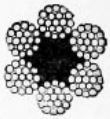
15 thread	or	7/16	in.	diameter, and larger sizes,		Basis
12	"	3/8	"	"	½c. above	"
9	"	5/16	"	"	1c.	" "
6	"	¼	"	"	1c.	" "
6	"	3/16	"	"	1½c.	" "
3	"	1/8	"	"	2c.	" "

APPROXIMATE WEIGHT, STRENGTH AND LENGTH OF MANILA ROPE.

Size in Circumference	Size in Diameter	Weight of 1000 feet	Weight per fathom	Strength of Manila Rope, lbs. Sisal Rope about 25 per cent. less	No. of feet in one pound. Feet	Inches	Tarred Hemp Rope, Weight of 1000 feet.	Weight per fathom
3/8	1/8	30		300	75			
1/2	5/32	35		540	60			
3/4	1/4	45		780	40		54	
1	5/16	55		1000	30		69	
1 1/8	3/8	65		1280	23		73	
1 1/4	7/16	75		1560	16	8	86	
1 1/2	1/2	85	1/2	2250	12	9	98	5/8
1 3/4	9/16	110	3/4	3060	9	8	135	7/8
2	5/8	140	5/8	4000	7	6	162	1
2 1/4	3/4	170	1	5000	6		214	1 1/4
2 1/2	1/8	200	1 1/8	6250	5		263	1 3/16
2 3/4	7/8	240	1 5/16	7500	4	3	290	1 3/4
3	1	275	1 3/8	9000	3	8	347	2
3 1/4	1 1/8	325	2	10500	3	2	400	2 1/2
3 1/2	1 1/8	380	2 1/8	12250	2	10	455	2 3/4
3 3/4	1 3/16	410	2 1/2	14000	2	5	526	3
4	1 1/4	460	3	16000	2	3	620	3 1/4
4 1/4	1 3/8	510	3 1/2	18000	2		719	3 3/4
4 1/2	1 7/16	585	3 3/4	20250	1	8	781	4 1/4
4 3/4	1 1/2	640	4 1/8	22500		7	870	5
5	1 5/8	720	4 1/2	25000	1	5	932	5 1/2
5 1/2	1 3/4	835	5 3/4	30250	1	3	1190	6 1/2
6	1 7/8	1050	6 3/4	36000		11 1/2	1400	8
6 1/4	2	1150	7 3/8	39000		10 2/3	1525	8 1/2
6 1/2	2 1/8	1250	8	42250		9 3/4	1688	9

STANDARD HOISTING ROPE.





Composed of 6 Strands and a Hemp Center. 19 Wires to the Strand.

SWEDISH IRON.

Trade No.	Circumference in inches	Diameter in inches.	Price per foot, cents.	Weight per foot, in lbs.	Ap. breaking strain in tons of 2000 lbs.	Proper working strain in tons of 2000 lbs.	Min. size of drum or sheave in feet.
00	8 5/8	2 3/4	$1.70	12.50	125	25.00	15
0	7 7/8	2 1/2	1.40	10.00	102	20.40	13 1/2
1	7 1/8	2 1/4	1.17	8.00	80	16.00	12
2	6 1/4	2	.92	6.30	64	12.80	11
3	5 1/2	1 3/4	.80	5.25	52	10.40	9
4	5	1 5/8	.63	4.10	42	8.40	8 1/2
5	4 3/4	1 1/2	.57	3.65	38	7.60	8
5 1/2	4 1/4	1 3/8	.48	3.00	30	6.00	7 1/2
6	4	1 1/4	.40	2.45	25	5.00	7
7	3 1/2	1 1/8	.33	2.00	20	4.00	6
8	3	1	.26	1.58	16	3.20	5
9	2 3/4	7/8	.20	1.20	12	2.40	4 1/2
10	2 1/4	3/4	.16	0.88	9	1.80	4
10 1/4	2	5/8	.12	0.60	6	1.20	3 1/2
10 1/2	1 3/4	9/16	.10	0.48	5	1.00	3
10 3/4	1 1/2	1/2	.08	0.39	4	0.80	2 3/4
10a	1 1/4	7/16	.07 1/2	0.29	3	0.60	2 1/2
b	1 1/8	3/8	.07	0.23	2 1/4	0.45	2
10c	1	5/16	.06 3/4	0.15	1 1/2	0.30	1 1/2
10d	3/4	1/4	.06 1/2	0.10	1 1/4	0.25	3/4

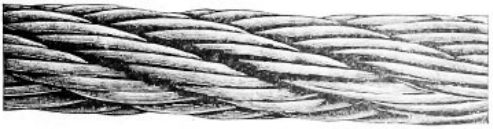
CRUCIBLE CAST STEEL.

00	8 5/8	2 3/4	$2.10	12.00	240	48.00	11
0	7 7/8	2 1/2	1.75	10.00	210	42.00	10
1	7 1/8	2 1/4	1.42	8.00	155	31.00	9
2	6 1/4	2	1.11	6.30	120	24.00	8
3	5 1/2	1 3/4	.93	5.25	100	20.00	7
4	5	1 5/8	.74	4.10	80	16.00	6 1/2
5	4 3/4	1 1/2	.66	3.65	73	14.60	6
5 1/2	4 1/4	1 3/8	.56	3.00	60	12.00	5 1/2
6	4	1 1/4	.46	2.45	52	10.40	5
7	3 1/2	1 1/8	.38	2.00	42	8.40	4 1/2
8	3	1	.30	1.58	32	6.40	4
9	2 3/4	7/8	.23	1.20	25	5.00	3 1/2
10	2 1/4	3/4	.18	0.88	18 1/4	3.65	3
10 1/4	2	5/8	.14	0.60	14	2.80	2 1/2
10 1/2	1 3/4	9/16	.12	0.48	10	2.00	2 1/4
10 3/4	1 1/2	1/2	.11	0.39	8 1/4	1.65	2
10a	1 1/4	7/16	.10	0.29	6	1.20	1 3/4
10b	1 1/8	3/8	.09 1/2	0.23	4 1/2	0.90	1 1/2
10c	1	5/16	.09 1/4	0.15	3 1/4	0.65	1
10d	3/4	1/4	.09	0.10	2 1/4	0.45	1/2

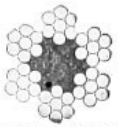
When the Iron or Steel Rope named above is *Galvanized* or *Tinned*, add 10 per cent. to List Price.

When made with *Wire Center*, add 10 per cent. to List Price.

TRANSMISSION AND HAULAGE ROPE.



Composed of 6 Strands and a Hemp Center.



7 Wires to the Strand.

SWEDISH IRON.

Trade No.	Circumference in inches.	Diameter in inches.	Price per foot, cents.	Weight per foot in lbs.	Av. breaking strain in tons of 2000 lbs.	Proper working strain in tons of 2000 lbs.	Min. size of drum or sheave in feet
11	4¼	1½	$ .51	3.65	35	7.00	11
12	4¼	1⅜	.43	3.00	30	6.00	10
13	4	1¼	.36	2.45	24	4.80	9¼
14	3½	1⅛	.29	2.00	20	4.00	8
15	3	1	.23	1.58	16	3.20	6¼
16	2¾	⅞	.17½	1.20	12	2.40	6
17	2¼	¾	.14	0.88	9.5	1.90	5¼
18	2⅛	11/16	.12	0.75	7.5	1.50	4¾
19	2	5/8	.10	0.60	6.2	1.24	4½
20	1¾	9/16	.08	0.48	5.1	1.02	4
21	1½	½	.06½	0.39	4.	0.80	3¼
22	1¼	7/16	.05½	0.29	3.	0.60	3½
23	1⅛	3/8	.04½	0.23	2.2	0.44	2¾
24	1	1/3	.03¾	0.15	1.4	0.28	2
25	⅞	5/16	.03¼	0.125	1.1	0.22	1¾

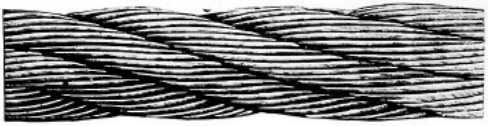
CRUCIBLE CAST STEEL.

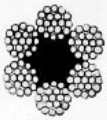
11	4¾	1½	$ .60	3.65	69	13.8	8
12	4¼	1⅜	.51	3.00	58	11.6	7½
13	4	1¼	.43	2.45	47	9.4	7
14	3½	1⅛	.36	2.00	39	7.8	6
15	3	1	.28	1.58	31	6.2	5
16	2¾	⅞	.22	1.20	24	4.8	4½
17	2¼	¾	.16	0.88	18.3	3.66	4
18	2⅛	11/16	.13½	0.75	15	3.00	3¾
19	2	5/8	.11	0.60	12.3	2.46	3½
20	1¾	9/16	.09	0.48	10.2	2.04	3
21	1½	½	.07½	0.39	8	1.60	2¾
22	1¼	7/16	.06½	0.29	6	1.20	2½
23	1⅛	3/8	.05½	0.23	4.4	0.88	2
24	1	5/16	.04½	0.15	3	0.60	1½
25	⅞	1/3	.04	0.125	2	0.40	1¼

When the Iron or Steel Rope named above is *Galvanized* or *Tinned*, add 10 per cent. to List Price.

When made with *Wire Center*, add 10 per cent. to List Price.

EXTRA STRONG CRUCIBLE CAST STEEL ROPE.





Composed of 6 Strands and a Hemp Center.
19 Wires to the Strand.

Trade number.	Approximate Circumference in inches.	Diameter in inches.	Price per foot cents.	Weight per foot in pounds.	Approximate breaking strain in tons of 2,000 pounds.	Proper working strain in tons of 2,000 pounds.	Minimum size of drum or sheave in feet.
00	8⅝	2¾	255	11.96	266	53.	18
0	7⅞	2½	210	9.85	222	45.	12
1	7⅛	2¼	170	8.00	182	36 4	10½
2	6¼	2	134	6.30	144	28 8	9½
3	5½	1¾	115	4.85	112	22.4	8
4	5	1⅝	91	4 15	97	19 4	7½
5	4¾	1½	80	3.55	84	16 8	7
5½	4¼	1⅜	67	3.00	72	14.4	6½
6	4	1¼	55	2.45	58	11.6	6
7	3½	1⅛	45	2 00	49	9.80	5½
8	3	1	36	1 58	39	7 80	4½
9	2¾	⅞	28	1.20	30	6.00	4
10	2¼	¾	22	0 89	22	4.40	3½
10¼	2	⅔	16¼	0.62	15.8	3 16	3
10½	1¾	9/16	14	0.50	12.7	2.54	2½
10¾	1½	½	12½	0.39	10 1	2 02	2¼
10a	1¼	7/16	11½	0 30	7.8	1.56	2
10b	1⅛	3/8	11	0.22	5 78	1.15	1¾
10c	1	5/16	10¾	0 15	4.05	0.81	1¼
10d	¾	¼	10½	0.10	2.70	0 54	⅝

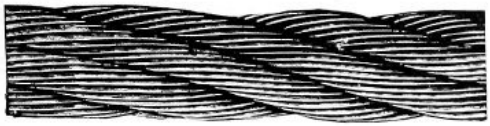
7 Wires to the Strand.

11	4¾	1½	75	3.55	79	15 8	9½
12	4¼	1⅜	64	3.00	68	13.6	9¼
13	4	1¼	53	2 45	56	11.2	8
14	3½	1⅛	44	2.00	46	9 20	7
15	3	1	34	1.58	37	7 40	6
16	2¾	⅞	26	1 20	28	5.60	5¼
17	2¼	¾	20	0 89	21	4 20	4¾
18	2⅛	11/16	17	0.75	18 4	3 68	4¼
19	2	5/8	14	0.62	15.1	3.02	4
20	1¾	9/16	11½	0.50	12.3	2.46	3½
21	1½	½	9½	0.39	9.70	1.94	3¼
22	1¼	7/16	7¼	0.30	7.50	1 50	3
23	1⅛	3/8	6	0.22	5.58	1.11	2¼
24	1	5/16	5½	0.15	3.88	0.77	1¾
25	⅞	5/32	5	0.125	3.22	0 64	1½

When the Rope named above is *Galvanized* or *Tinned*, add 10 per cent. to List Price.

When made with *Wire Center*, add 10 per cent. to List Price.

PLOUGH STEEL ROPE.



Composed of 6 Strands and a Hemp Center. 19 Wires to the Strand.

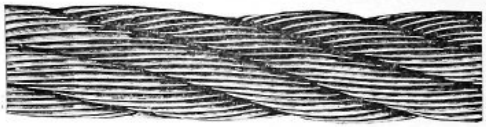
Trade Number	Circumference in inches.	Diameter in inches.	Price per foot, cents.	Weight per foot in pounds.	Approximate breaking strain in tons of 2000 pounds.	Proper working strain in tons of 2000 pounds.	Minimum size of drum or sheave in feet.
00	8 5/8	2 3/4	$3.00	12.00	300	60.	15
0	7 7/8	2 1/2	2.50	10.00	260	56.	13 1/2
1	7 1/8	2 1/4	2.00	8.00	210	42.	12
2	6 1/4	2	1.56	6.30	165	33.	11
3	5 1/2	1 3/4	1.35	5.25	134	26.8	9
4	5	1 5/8	1.08	4.10	109	21.8	8 1/2
5	4 3/4	1 1/2	.93	3.65	99	19.8	8
5 1/2	4 1/4	1 3/8	.77	3.00	79	15.8	7 1/2
6	4	1 1/4	.63	2.45	69	13.8	7
7	3 1/2	1 1/8	.52	2.00	57	11.4	6
8	3		.43	1.58	43	8.6	5
9	2 3/4	7/8	.34	1.20	30	6.0	4 1/2
10	2 1/4	3/4	.26	0.88	24	5.0	4
10 1/4	2	5/8	.19	0.60	17	3.4	3 1/2
10 1/2	1 3/4	9/16	.16	0.48	13	2.6	3
10 3/4	1 1/2	1/2	.14	0.39	11	2.2	2 3/4
10a	1 1/4	7/16	.13	0.29	8.2	1.64	2 1/2
10b	1 1/8	3/8	12 1/2	0.23	6.2	1.22	2
10c	1	5/16	12 1/4	0.15	4.3	0.86	1 1/2
10d	3/4	1/4	.12	0.10	3.0	0.60	1 1/4

7 Wires to the Strand.

11	4 3/4	1 1/2	$ .90	3.65	94	18.8	11
12	4 1/4	1 3/8	.75	3.00	79	15.8	10
13	4	1 1/4	.61	2.45	64	12.8	9 1/4
14	3 1/2	1 1/8	.51	2.00	53	10.6	8
15	3	1	.41	1.58	42	8.4	6 3/4
16	2 3/4	7/8	.32	1.20	31	6.2	6
17	2 1/4	3/4	.25	0.88	25	5.0	5 1/4
18	2 1/8	11/16	20	0.75	20	4.0	4 3/4
19	2	5/8	17	0.60	17	3.4	4 1/2
20	1 3/4	9/16	14	0.48	14	2.8	4
21	1 1/2	1/2	11	0.39	10	2.0	3 3/4
22	1 1/4	7/16	08	0.29	8	1.6	3 1/2
23	1 1/8	3/8	06 1/2	0.23	7	1.4	2 3/4
24	1	5/16	06	0.15	4	0.8	2
25	7/8	9/32	05 1/2	0.125	3.5	0.7	1 3/4
26	3/4	1/4	05 1/4	0.10	2.7	0.5	1 1/2

When the Rope named above is *Galvanized* or *Tinned*, add 10 per cent. to List Price.
When made with *Wire Center*, add 10 per cent. to List Price.

"GIANT" WIRE ROPE.



Composed of 6 Strands and a Hemp Center. 19 Wires to the Strand.

Trade number.	Approximate Circumference in inches	Diameter in inches.	Price per foot, cents.	Weight per foot in pounds.	Approximate breaking strain in tons of 2,000 pounds.	Proper working strain in tons of 2,000 pounds.	Minimum size of drum or sheave in feet.
1	7⅛	2¼	218	8.00	235	47.00	15
2	6¼	2	172	6.30	201	40.20	14
3	5½	1¾	147	5.00	160	32.00	13
4	4¾	1½	103	3.55	115	23.00	11
5	4¼	1⅜	86½	3.00	95	19.00	10
6	4	1¼	71	2.50	76	15.20	9
7	3½	1⅛	57½	2.00	63	12.60	8
8	3	1	48½	1.58	48	9.60	7
9	2¾	⅞	39	1.20	37	7.40	6
10	2¼	¾	30	0.89	29	5.80	5
10¼	2	⅝	22½	0.62	20	4.00	4
10½	1½	½	16½	0.39	13	2.60	2¾
10¾	1⅛	⅜	14½	0.22	8	1.60	2
			7 Wires to the Strand.				
11	4	1¼	68	2.28	72	14.40	10
12	3½	1⅛	56	1.82	60	12.00	9
13	3	1	45	1.50	45	9.00	8
14	2¾	⅞	35	1.12	34	6.80	7
15	2¼	¾	28	0.92	25	5.00	6
16	2	⅝	20	0.57	18	3.60	5½
17	1½	½	13	0.31	10	2.00	3

When the Rope named above is *Galvanized* or *Tinned*, add 10 per cent. to List Price.
When made with *Wire Center*, add 10 per cent. to List Price.

TILLER ROPE.

Composed of 6 Ropes and a Hemp Center.

Each Rope consisting of 6 Strands of 7 Wires each and a Hemp Core.

Circumference in inches.	Diameter in inches.	Price per foot, cents.		Weight per foot in pounds.
		Iron.	Cast Steel.	
3	1	$ .33	$ .43	1.10
2¾	7/8	.27	.36	0.84
2½	¾	.22	.30	0.62
2	5/8	.17	.24	0.42
1¾	9/16	.14	.19	0.34
1½	½	.11	.17	0.26
1¼	7/16	.10	.15	0.20
1⅛	3/8	.09	.14	0.16
1	5/16	.08	.12½	0.11
¾	¼	.07½	.11	0.07

GALVANIZED STEEL WIRE STRAND.

For Smoke Stacks, Guys, Signal Strand, Trolley Span Wire and Other Purposes.

Composed of 7 Wires Twisted Together.

Diameter in inches.	Weight per 100 feet in pounds.	Approximate breaking strain in pounds.	Price per 100 feet, cents.
½	52	8320	$3.15
7/16	40	6000	2.50
3/8	30	4700	2.00
5/16	22	3300	1.60
¼	13	1750	1.15
9/16	8	1000	.80
5/16	5	700	.60
⅛	3½	375	.45
3/16	2¼	320	.35

GALVANIZED STEEL HAWSERS.

Composed of 6 Strands and a Hemp Center, each Strand consisting of 12 Wires and a Hemp Core.

Circumference in inches.	Approximate Diameter in inches.	Price per foot, cents.	Weight per foot in pounds.	Approximate breaking strain in tons of 2,000 pounds.	Circumference in inches of new manila hawser of equal strength.
5½	1¾	50	3.25	61	13½
5¼	1 11/16	53	3.04	57	13
5	1⅝	48	2.75	52	12½
4¾	1½	44	2.46	45	12
4½	1 7/16	41	2.20	42	11½
4¼	1⅜	37	1.95	39	11
4	1¼	34	1.70	34	10
3¾	1 3/16	30	1.50	30	9¼
3½	1⅛	27	1.31	27	8¾
3¼	1 1/16	25	1.13	23	8½
3	1	21	0.97	20.0	8
2¾	7/8	19	0.81	16.5	6½
2½	13/16	16	0.66	18.2	6
2¼	¾	14	0.54	12.3	5½

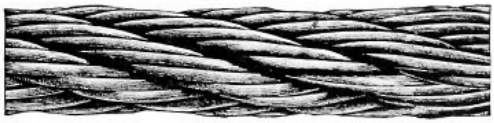
Composed of 6 Strands and a Hemp Center, each Strand consisting of 24 Wires and a Hemp Core.

Circumference in inches.	Approximate Diameter in inches.	Price per foot, cents.	Approximate Weight per foot in pounds.
6¼	2	108	5.50
5½	1¾	86	4 30
5	1⅝	74	3.70
4¾	1½	63	3.15
4¼	1⅜	55	2.65
4	1¼	50	2.15
3½	1⅛	35	1 75
3	1	28	1.40

Composed of 6 Strands and a Hemp Center, each Strand consisting of 30 Wires and a Hemp Core.

Circumference in inches.	Approximate Diameter in inches.	Price per foot, cents.	Weight per foot in pounds.
6¼	2	115	5.00
5½	1¾	90	4 05
5	1⅝	78	3 50
4¾	1½	68	3.00
4¼	1⅜	60	2.45
4	1¼	52	2.00
3½	1⅛	37	1.65
3	1	30	1.30

GALVANIZED IRON WIRE ROPE.



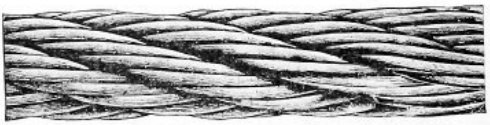
For Ships' Rigging and Derrick Guys.

Composed of 6 Strands and a Hemp Center. 7 or 12 Wires to the Strand.

Circumference in inches.	Diameter in inches.	Price per foot, cents. With 7 Wires to Strand	Price per foot, cents. With 12 Wires to Strand.	Weight per foot in pounds.	Approximate breaking strain in tons of 2000 pounds.	Circumference in inches of manila rope of equal strength.
5½	1¾	$ .44	$ .46	4.85	42	11
5¼	1 11/16	.41	.43	4.54	39	10½
5	1⅝	.38	.40	4.10	34	10
4¾	1½	.35	.37	3.68	32	9½
4½	1 7/16	.31	.33	3.28	28	9
4¼	1⅜	.27	.29	2.91	25	8½
4	1¼	.24	.25	2.54	23	8
3¾	1 3/16	.21	.22	2.24	21	7½
3½	1⅛	.18	.19	1.96	17	7
3¼	1 1/16	.16	.17	1.69	15	6½
3	1	.14	15	1.44	13	6
2¾	⅞	.12		1.20	11	5½
2½	13/16	.10		0.98	8.5	5
2¼	¾	.09		0.81	7.3	4½
2	5/8	.08		0.62	5.8	4
1¾	9/16	.07		0.47	4.2	3½
1½	½	.06		0.35	3.2	3
1¼	7/16	.05		0.25	2.2	2½
1⅛	3/8	.04		0.21	1.8	2¼
1	5/16	03½		0.16	1.6	2
		6 Strands, 7 Wires each.				
⅞	9/32	.03		0.122	1.08	1¾
¾	¼	.02½		0.090	0.85	1½
⅝	7/32	.02¼		0.060	0.72	1¼
½	5/16	.02		0.038	0.39	1⅛

NOTE.—When made with *Wire Center*, add 10 per cent. to List Price.

GALVANIZED CAST STEEL YACHT RIGGING.



Composed of 6 Strands and a Hemp Center, 7 or 19 Wires to the Strand.

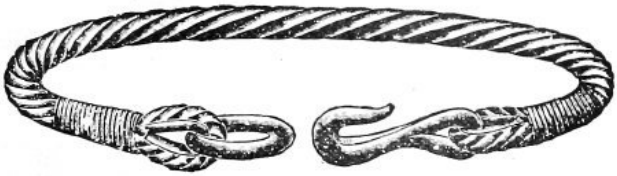
Circumference in inches.	Approximate Diameter in inches.	Price per foot, cents.		Weight per foot in pounds.	Approximate breaking strain in tons of 2,000 pounds.	Circumference in inches of manila rope of equal strength.
		With 7 wires to strand.	With 19 wires to strand.			
4	1¼	48	50	2.54	53	13
3¾	1 3/16	44	46	2.24	47	12
3½	1⅛	40	42	1.96	41	11
3¼	1 1/16	36	38	1.69	35	10
3	1	31	33	1.44	30	9
2¾	15/16	25	26	1.20	25	8½
2½	13/16	21	23	0.98	20	8
2¼	¾	18	20	0 81	17	7
2	5/8	12	16	0.62	14	6
1¾	9/16	10	13½	0 47	10	5¼
1½	1/2	8½	12	0.35	8	4⅝
1⅜	11/32	8	11½	0 30	6	4½
1¼	7/16	7½	11	0.25	5	4¼
1⅛	3/8	6¼	10½	0.20	4 3	3½
1	5/16	5	10	0 16	3.6	3

GALVANIZED IRON AND CAST STEEL RUNNING ROPE.

Composed of 6 Strands and a Hemp Center, each Strand consisting of 12 Wires and a Hemp Core.

Circumference in inches.	Approximate Diameter in Inches.	Price per foot, cents.		Weight per foot in pounds.	Approximate breaking strain in tons of 2,000 pounds.	
		Iron.	Cast Steel.		Iron.	Cast Steel.
3¼	1 1/16	22	30	1.13	10	23
3	1	20	27	0.97	8.6	20
2¾	15/16	17	23	0.81	7.3	16.5
2½	13/16	14½	19	0.66	5.6	13.2
2¼	¾	11½	15	0 54	4.8	11.2
2	5/8	9	12	0.42	3 8	9.0
1¾	9/16	8	10	0 32	2.7	6.6
1½	1/2	7	9	0 24	2.1	5.3
1¼	7/16	6½	8½	0.17	1.4	3.3
1⅛	3/8	6	7¾	0 14	1.25	2.7
1	5/16	5½	7	0.11	1.1	2.2

LOCOMOTIVE CAST STEEL SWITCHING AND WRECKING ROPE.



Hook and Thimble in One End. Thimble and Link in the Other End.

Length in feet.	Diameter in inches.					
	1½	1¼	1⅛	1	⅞	¾
20	$30 75	$19.25	$17 10	$13 00	$11 35	$ 7.60
25	34.00	21.50	19 00	14.50	12.50	8.50
30	37 25	23 75	20 90	16.00	13.65	9 40
35	40 50	26.00	22 80	17.50	14 80	10 30
40	43.75	28.25	24 70	19 00	15.95	11.20
45	47 00	30.50	26 60	20 50	17 10	12.10
50	50.25	32.75	28.50	22.00	18.25	13.00

For each variation in length of 1 foot, add to, or deduct from, above list:

Per foot.	65c.	45c.	38c.	30c.	23c.	18c.

Hook, Thimble and Link in One End; Thimble and Two Links in Other End.

20	$34 75	$22.25	$19 60	$15 00	$13 10	$ 9.10
25	38.00	24.50	21.50	16.50	14.25	10.00
30	41 25	26.75	23 40	18.00	15.40	10.90
35	44 50	29.00	25.30	19.50	16 55	11 80
40	47 75	31 25	27 20	21.00	17 70	12.70
45	51.00	33 50	29 10	22.50	18 85	13.60
50	54.25	35 75	31.00	24 00	20 00	14 50

For each variation in length of 1 foot, add to, or deduct from, above list:

Per foot.	65c.	45c.	38c.	30c.	23c.	18c.

Diameter of Rope in inches.....	1½	1¼	1⅛	1	⅞	¾
Breaking Strain in Tons.....	73	52	42	32	25	18¼

CLOSED SOCKETS.

Circumference of rope in inches.	Diameter of rope in inches.	Iron or Steel Rope.	
		Loose.	Fastened.
7⅛	2¼	$21.00	$32 00
6¼	2	16.00	25 50
5½	1¾	13 00	21 00
5	1⅝	12.00	18.00
4¾	1½	6 80	11.80
4¼	1⅜	6 00	10.25
4	1¼	4.50	8.00
3½	1⅛	3 30	6 15
3	1	2 40	4 65
2¾	⅞	1 85	3 85
2¼	¾	1 65	3 15
2	⅝	1.35	2 65
1¾	9/16	1.10	2 35
1½	½	1.10	2 25
1¼	7/16	85	2 00
1⅛	⅜	.85	1 85
1	5/16	.70	1 60
¾	¼	.70	1 60

OPEN SOCKETS.

7⅛	2¼	$23 00	$34 00
6¼	2	16 50	26 00
5½	1¾	15 50	23.50
5	1⅝	13.00	19 00
4¾	1½	8.00	13 00
4¼	1⅜	7.50	11.75
4	1¼	6.10	9.60
3½	1⅛	4.50	7 35
3	1	3.15	5 40
2¾	⅞	2 50	4 50
2¼	¾	2 10	3 60
2	⅝	1.65	2 95
1¾	9/16	1.35	2 60
1½	½	1 35	2 50
1¼	7/16	1 00	2.15
1⅛	⅜	1.00	2 00
1	5/16	.85	1 75
¾	¼	.85	1.75

SWIVEL HOOK AND SOCKET.

Circum. of rope in in.	Diam. of rope in in.	For cast steel rope.		For Iron rope.	
		Loose.	Fastened.	Loose.	Fastened.
4¾	1½	$27.00	$32.00	$22.00	$27.00
4¼	1⅜	21 00	25.25	17.00	21 25
4	1¼	17 00	20 50	13 50	17.00
3½	1⅛	12 00	14.85	9 00	11.85
3	1	8.35	10 60	5.70	7 95
2¾	⅞	7.00	9 00	4 75	6.75
2¼	¾	5.25	6.75	4 00	5.50
2	⅝	4 60	5 90	3.60	4.90
1¾	9/16	3 75	5.00	3.00	4 25
1½	½	3 55	4.70	3.00	4.15
1¼	7/16	2 85	4.00	2.55	3 70
1⅛	⅜	2.70	3.70	2 35	3 35
1	6/16	2 30	3 20	2.00	2 90
¾	¼	2.30	3 20	2.00	2.90

HOOK AND SOCKET.

4¾	1½	$14 50	$19.50	$12.50	$17.50
4¼	1⅜	12 30	16.55	10 25	14 50
4	1¼	10.00	13 50	8.00	11 50
3½	1⅛	8 25	11 10	6 25	9.10
3	1	6.50	8.75	4.60	6.85
2¾	⅞	5.25	7 25	3.70	5.70
2¼	¾	3 85	5 35	3.00	4.50
2	⅝	2.90	4.20	2 30	3 60
1¾	9/16	2 45	3.70	2 00	3 25
1½	½	2.10	3.25	1 95	3 10
1¼	7/16	1.70	2.85	1.55	2.70
1⅛	⅜	1 65	2 65	1 50	2.50
1	6/16	1.45	2 35	1.25	2.15
¾	¼	1.45	2 35	1 25	2.15

HEAVY GALVANIZED OVAL THIMBLES.

Cir. of rope in in.	Width score in in.	Price in cents.	Cir. of rope in in.	Width score in in.	Price in cents.
4¾	1½	50	2	⅝	13
4¼	1⅜	42	1¾	9/16	12
4	1¼	33	1½	½	11
3½	1⅛	25	1¼	7/16	10
3	1	20	1⅛	⅜	9
2¾	⅞	16	1	5/16	8
2¼	¾	15	¾	¼	8

THIMBLE SPLICED ON ROPE.

Circumference of rope in inches.	Diameter of rope in inches.	For cast steel rope.	For iron rope.
4¾	1½	$6.50	$6.00
4¼	1⅜	5.75	5.25
4	1¼	4.70	4.35
3½	1⅛	3.90	3.65
3	1	3.00	2.85
2¾	⅞	2.55	2.40
2½	¾	2.00	1.85
2	5/8	1.55	1.45
1¾	9/16	1.30	1.20
1½	½	1.25	1.15
1¼	7/16	1.20	1.10
1⅛	⅜	1.15	1.05
1	5/16	1.10	1.00
¾	¼	1.10	1.00

SISTER HOOKS AND THIMBLE.

Circum. of rope in in.	Diam. of rope in in.	For cast steel rope.		For iron rope.	
		Loose.	Fastened.	Loose.	Fastened.
4¾	1½	$7.00	$13 50	$5.00	$11.00
4¼	1⅜	5.40	11.15	3.40	8 65
4	1¼	4 60	9 20	2 65	6 90
3½	1⅛	4 40	8.15	2 40	5.90
3	1	3.75	6 70	1.90	4 65
2¾	⅞	2 90	5.35	1.40	3.70
2¼	¾	1.85	3.75	1.10	2 85
2	⅝	1 40	2 85	.85	2.20
1¾	9/16	1.10	2 40	.75	1.95
1½	½	.80	2 05	.65	1 80
1¼	7/16	.75	1 95	.60	1.70
1⅛	⅜	.70	1 85	.55	1.60
1	5/16	.65	1.75	.50	1.50
¾	¼	65	1.75	.50	1 50

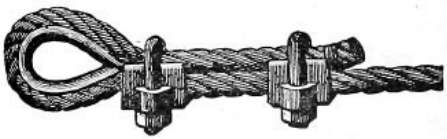
HOOK AND THIMBLE.

4¾	1½	$7.00	$13.50	$5.00	$11.00
4¼	1⅜	5.40	11.15	3.40	8.65
4	1¼	4 60	9.20	2.65	6.90
3½	1⅛	4.40	8.15	2 40	5.90
3	1	3.75	6.70	1.90	4 65
2¾	⅞	2.90	5.35	1.40	3.70
2¼	¾	1.85	3.75	1.10	2 85
2	⅝	1 40	2 85	.85	2.20
1¾	9/16	1.10	2 40	.75	1.95
1½	½	.80	2.05	.65	1 80
1¼	7/16	.75	1.95	.60	1.70
1⅛	⅜	.70	1.85	.55	1.60
1	5/16	.65	1.75	.50	1.50
¾	¼	.65	1.75	.50	1.50

WIRE ROPE CLAMPS.

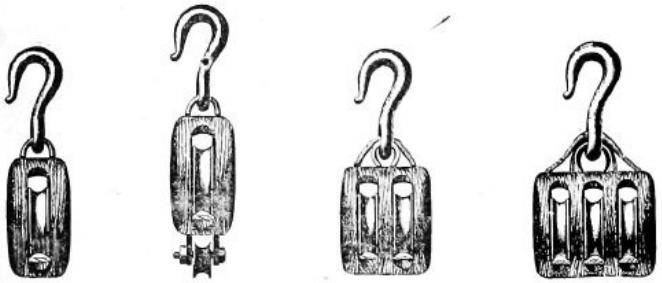
Circumference of rope in inches.	Diameter of rope in inches.	Price in cents	Circumference of rope in inches.	Diameter of rope in inches.	Price in cents
7⅛	2¼	$8.00	3	1	.60
6¼	2	5.00	2¾	⅞	.50
5½	1¾	4.00	2½	13/16	.45
5	1⅝	3.00	2¼	¾	.40
4½	1 7/16	1.50	2	5/8	.35
4	1¼	1.10	1¾	9/16	.33
3¾	1 1/16	.90	1½	½	.30
3½	1⅛	.75	1¼	7/16	.28
3¼	1 1/16	65	1	5/16	.25

WIRE ROPE CLIPS.



Circumference of rope in inches.	Diameter of rope in inches.	Price in cents.	Circumference of rope in inches.	Diameter of rope in inches.	Price in cents.
7⅜	2½	$6.00	3	1	.50
7⅛	2¼	5.00	2¾	⅞	.45
6¼	2	4.00	2½	¾	.40
5½	1¾	3.50	2	5/8	.35
4¾	1½	60	1½	½	.30
4¼	1⅜	.55	1⅛	3/8	.25
4	1¼	.50	1	5/16	.25
3½	1⅛	.50	¾	¼	.25

IRON STRAPPED TACKLE BLOCKS.



Dimensions.				Common Iron Bushed			Patent Roller Bushed.			Self-Lubricating, Metaline or Bronze Bushed		
Size of Sheave, Inches	For Diameter Rope, Inches.	Length of Shell, Inches.	Mortise Inches.	Single. Each	Double. Each	Triple. Each.	Single. Each.	Double. E	Triple. Each	Single. Each	Double Each.	Triple Each
¾x ½x⅜	⅜	3	⅝	$0.70	$1.30	$1.75	$1.10	$2.00	$2.90	.....	.....	.....
2 x ½x⅜	⅜	3½	⅝	.75	1.45	2.00	1.15	2.20	3.15	.....	.....	.....
2¼x ⅝x⅜	½	4	⅝	.85	1.60	2.15	1.20	2.25	3.25	$1.50	$2.90	$4.15
3 x ¾x⅜	⅜	5	⅝	.90	1.75	2.25	1.25	2.35	3.50	1.75	3.35	4.75
3½x1 x½	⅝	6	1	1.10	2.00	2.90	1.60	2.85	4.40	2.20	4.00	5.80
4¼x1 x½	⅞	7	1⅛	1.30	2.40	3.50	1.70	3.35	5.00	2.50	4.50	6.70
4¾x1½x⅝	1	8	1¼	1.65	2.85	4.25	2.25	4.15	6.00	3.25	5.70	8.50
5½x1½x⅝	1	9	1¼	1.85	3.40	4.75	2.50	4.70	7.25	3.70	6.75	10.00
6¼x1½x⅝	1¼	10	1⅜	2.75	4.50	6.25	3.50	6.00	8.50	4.75	8.50	12.50
7¼x1½x⅝	1¼	11	1⅜	4.45	7.50	10.65	5.30	9.20	13.20	6.75	12.50	18.50
8 x1½x⅝	1½	12	1½	4.45	7.50	10.65	5.30	9.20	13.20	6.75	12.50	18.50
9 x1½x⅝	1½	13	1½	7.00	10.50	15.00	8.15	12.80	18.45	9.75	17.00	25.00
9½x1½x⅝	1½	14	1¾	7.00	10.50	15.00	8.15	12.80	18.45	9.75	17.00	25.00
10 x1⅝x⅞	1½	15	1¾	8.00	13.00	18.00	9.25	15.50	21.75	11.00	19.50	28.50
11 x1⅝x⅞	1½	16	1⅞	10.00	15.00	22.00	11.50	18.00	29.50	.....	.....	.....

For Blocks with mortise wider than above, add 10 per cent. to list for each extra ¼ inch or fraction thereof.
For list on Quadruple Blocks, add the lists for Single and Triple together.

Special ruling for Beckets in all Iron Strapped Tackle Blocks

Beckets may be allowed in all single, one-half double, and one-third triple, on any orders without charge. For any additional proportion than above, the sum of 5 cents each, net, shall be charged for each additional becket on blocks 5 inch and under, and 1 cent net per inch of shell measurement for each additional becket in sizes larger than 5 inch. (Above means length of shell regardless of number of mortises.)

SINGLE.

HOLLOW STEEL TACKLE BLOCKS.

WITH LOOSE HOOKS.

DOUBLE.

Dimensions.		Iron Bushed.			Ford's Patent, Self-Lubricating.			Five-Roll Self-Adjusting Roller Bushed.			Self-Lubricating, Metaline or Bronze Bushed		
For Din Rope	Size.	Single.	Double.	Triple.	Single.	Double	Triple.	Single.	Double.	Triple.	Single	Double.	Triple.
½	4	$0.90	$1.75	$2.50	$1.00	$2.00	$2.85	$1.25	$2.45	$3.50	$1.65	$3.25	$4.75
⅝	5	1.00	1.90	2.75	1.12	2.15	3.10	1.35	2.60	3.65	1.80	3.50	5.15
¾	6	1.25	2.25	3.25	1.40	2.55	3.70	1.65	3.05	4.25	2.10	4.00	5.80
⅞	7	1.50	2.70	4.00	1.70	3.10	4.60	1.90	3.50	4.70	2.45	4.60	6.85
1	8	1.85	3.20	4.75	2.10	3.70	5.50	2.45	4.40	6.20	2.90	5.30	7.90
1	9	2.40	4.00	5.50	2.70	4.60	6.40	3.00	5.20	7.00	3.55	6.30	9.00
1⅛	10	3.10	5.10	7.00	3.50	5.90	8.20	3.85	6.60	8.85	4.40	7.70	11.00
1¼	12	5.00	8.25	11.75	5.65	9.55	13.70	5.85	9.95	14.30	6.45	11.15	16.00
1½	14	7.50	11.75	16.50	8.50	13.75	19.50	8.75	14.25	20.25	9.10	15.00	21.30

These blocks are hollow and, being made of sheet steel, are very much lighter than wood blocks. The steel shells are stronger than wood and will not split or shrink. The strain comes entirely on the wrought-iron straps. They have rounded edges to protect the rope, and are handsomely finished.

SNATCH BLOCKS.—WOOD.

FIG. 1669.

LOCKPORT.

Fig. 1669.

Size of Sheave. Inches.	For Diameter Rope. Inches.	Lth Shell. Inches.	Common Iron Bushed. Each.	Patent Roller Bushed. Each.	Self-Lubricating, Metaline or Bronze Bushed. Each.	Galvanized Straps. Extra Net List. Each.
3 x1¼x ½	⅞	6	$ 4.00	$ 4.75	$ 5.25	$0.20
3½x1¾x ½	⅞	7	4.75	5.50	6.00	.25
4½x1⅜x ⅝	1	8	5.75	6.60	7.25	.35
5 x1¾x ⅝	1⅛	9	6.75	7.75	8.50	.40
5¾x1⅞x ¾	1⅜	10	8.50	10.00	11.00	.65
6¾x2¼x ¾	1½	12	10.00	11.50	13.00	.90
8 x2¼x ⅞	1¾	14	13.00	15.00	16.50	1.20
9 x2⅝x1	2	16	17.00	20.00	22.00	.....
10 x3 x1	2¼	18	25.00	28.50	31.00	.....
11 x3½x1¼	2½	20	38.00	43.00	46.00	.....
11¾x4¼x1½	3	22	55.00	63.00	68.00	.....
12½x4½x1½	3½	24	70.00	78.00	86.00	.....

A steel spring under the link, keeps same always in position.

LOCKPORT STEEL AND WROUGHT IRON.

Fig. 1670.

STEEL AND WROUGHT IRON SNATCH BLOCKS. FIG. 1670.

Size of Sheave. Inches.	For Diameter Rope. Inches.	Length of Shell. Inches.	Common Iron Bushed. Each.	Self-Lubricating, Metaline or Bronze Bushed. Each.
3 x1¼x ½	⅞	6	$ 5.00	$ 5.50
3½x1¾x ½	⅞	7	5.50	6.00
4½x1⅜x ⅝	1	8	7.00	7.65
5 x1⅜x ⅝	1⅛	9	8.00	9.00
5¾x1⅞x ¾	1¼	10	9.00	10.50
6¾x2¼x ¾	1½	12	11.50	13.00
8 x2¼x ⅞	1¾	14	15.00	16.25
9 x2⅝x1	2	16	20.00	21.75
10 x3 x1	2¼	18	25.00	28.00
11 x3½x1¼	2½	20	36.00	39.50
11¾x4¼x1½	3	22	52.00	60.50
12½x4½x1½	3½	24	72.00	85.00

Prices on the above blocks, either five-roller, six-roller, or FORD'S PATENT SELF-LUBRICATING Bushed, quoted upon application.

STEEL TACKLE BLOCKS.

WITH LOOSE HOOKS.

Edges of plates rounded to protect the rope. Sizes 9 inches and larger have the same score as wide mortise wooden blocks and will take the same size rope.

Fig. 1671.

Fig. 1672.

Dimensions		Iron Bushed.			Self-Lubricating, Ford's Patent.			Self-Lubricating, Metaline or Bronze Bushed.		
Length of Shell Inches.	For Dia. Rope. Inches.	Single. Each.	Double. Each.	Triple. Each.	Single. Each.	Double. Each.	Triple. Each.	Single. Each.	Double. Each.	Triple. Each.
4	½	$0.90	$1.75	$2.50	$1.00	$2.00	$2.85	$1.65	$3.25	$4.75
5	⅝	1.00	1.90	2.75	1.12	2.15	3.10	1.80	3.50	5.15
6	¾	1.25	2.25	3.25	1.40	2.55	3.70	2.10	4.00	5.80
7	⅞	1.50	2.70	4.00	1.70	3.05	4.50	2.45	4.60	6.85
8	1	1.85	3.20	4.75	2.10	3.60	5.35	2.90	5.30	7.90
9	1⅛	2.40	4.00	5.50	2.70	4.50	6.20	3.55	6.30	9.00
10	1¼	3.10	5.10	7.00	3.50	5.75	7.90	4.40	7.70	11.00
12	1½	5.00	8.25	11.75	5.65	9.30	13.25	6.45	11.15	16.00
14	1¾	7.50	11.75	16.50	8.50	13.25	18.60	9.10	15.00	21.30

Fig. 1673.

Prices on the above blocks, either five-roller or six-roller bushed, quoted upon application.

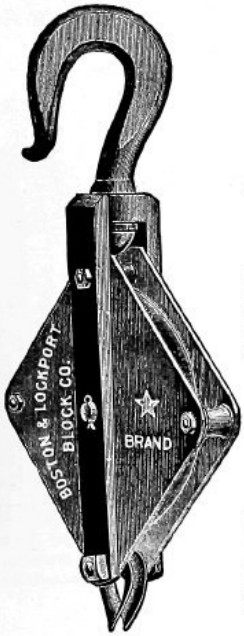


Fig. 1674.

LIST OF BLOCKS FOR WIRE ROPE.

LOOSE HOOKS, SHACKLES, STIFF SWIVEL HOOKS.

IRON BUSHED.

Size Sheave.	Wire Rope.	Single.	Double.	Triple.
10x1¼x1	½ & 5/8	$14.00	$20.00	$28.00
12x1½x1¼	5/8 & ¾	16.00	23.00	31.00
14x1½x1¼	¾ & 7/8	18.00	25.00	36.00
16x1½x1½	7/8	31.00	40.00	46.00
18x1¾x1½	1 in.	34.50	45.00	53.00

METALINE OR PHOSPHOR BRONZE BUSHED.

Size Sheave.	Wire Rope.	Single.	Double.	Triple.
10x1¼x1	½ & 5/8	$17.00	$26.00	$37.00
12x1½x1⅛	5/8 & ¾	19.00	29.00	41.00
14x1½x1¼	¾ & 7/8	21.00	31.00	45.00
16x1½x1½	7/8	36.00	50.00	62.00
18x1¾x1½	1 in.	40.00	56.00	68.00

For Blocks with Loose Swivel Hooks, add $3.50 each to the list price.

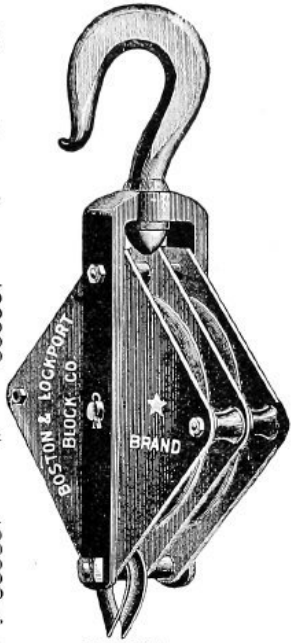


Fig. 1675.

IRON SHEAVES FOR WIRE ROPE.

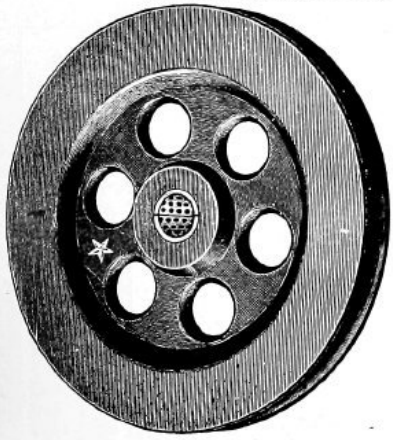


Fig. 1676.

Size.	Thickness at Hub.	Size Wire.	Common.	Metaline Bushed.
6x1 x ¾	1/16 in.	½ in.	$0 75	$2 10
*6x1½x ¾	1/16 "	¾ "	.90	2 50
7x1 x ¾	1/16 "	½ "	1 00	2 30
*7x1⅜x ¾	1/16 "	5/8 "	1 10	2 65
8x1 x ⅞	1⅜ "	½ "	1 15	2 85
*8x1¼x ⅞	1⅜ "	5/8 "	1.25	3 25
*8x1½x ⅞	1⅛ "	¾ "	1.55	3 75
9x1 x ⅞	1⅛ "	½ "	1.30	3 25
*9x1⅜x ⅞	1⅛ "	5/8 "	1 75	4 00
*9x1½x ⅞	1⅝ "	¾ "	1 85	4 30
9x1⅝x ⅞	1⅛ "	⅞ "	2 05	4 50
*†10x1¼x1	1⅜ "	⅞ "	2 65	4 00
*10x1½x1	1⅝ "	¾ "	2 75	4 50
*†12x1½x1⅛	1¾ "	¾ "	3.25	6 00
*†14x1½x1¼	1¾ "	⅞ "	4 20	7 75
16x1½x1½	1¾ "	⅞ "	4 40	8 50
*†16x1¾x1½	2 "	1 "	6 50	9 00
18x1½x1½	1¾ "	⅞ "	6 75	10 00
*†18x1¾x1½	2 "	1 "	7 85	10 90
20x1¾x1½	2 "	⅞ "	8 05	12 25
22x1¾x1½	2 "	⅞ "	9 65	13 60
24x1¾x1½	2 "	⅞ "	11 90	16 50
24x2 x1½	2⅛ "	1⅛ "	10 00	16 50

*Extra heavy pattern with deep rim. †Regular pattern. Carried in stock. All other sizes can be had at short notice. Where larger pin-hole is required, add 50 cents for each one-eighth.

WESTON DIFFERENTIAL CHAIN HOISTS.

"DIRECT" PATTERN.

Price list of complete Hoists.

Capacity, tons.	Will Lift, feet.	Price Complete.	Regular Chain, feet.	Extra Chain, per foot.	Weight with Chain, lbs.	Shortest Distance between Hooks, in.
½	6	$18.00	22	$0.70	20	17
¾	7	21.00	26	.70	31	21
1	8	28.00	30	.75	53	26
1½	8½	36.00	33	.80	90	32
2	9	45.00	36	.85	128	39
3	10	60.00	28	1.00	167	44

Price list of parts.

Capacity, tons	Sheaves.		Yokes and Hooks.		Pins.		Regular Chains complete, Each.
	Top.	Bottom.	Top.	Bottom.	Top.	Bottom.	
½	$3.60	.90	3.00	2.25	.40	.30	10.50
¾	4.80	1.30	3.75	3.00	.50	.40	12.50
1	6.00	1.50	4.50	3.75	.50	.40	17.00
1½	8.40	1.90	5.50	4.50	.60	.50	21.50
2	12.00	2.25	7.50	5.50	.60	.50	27.00
3	15.60	3.75	11.00	8.00	.70	.60	36.00

Allow 4 feet of chain for each additional foot of lift.

WESTON DIFFERENTIAL CHAIN HOISTS.

"GEARED" PATTERN.

Capacity, tons.	Main Chain in Blocks of Regular Lift, feet.	Hand Chain in Blocks of Regular Lift, feet.	Will Lift, feet.	Weight Each, lbs.	Extra Main Chain, per foot	Extra Hand Chain, per foot	Price Complete, Each.
1	22	16	8	70	$0.75	$0.75	$45.00
1½	24	18	9	126	.85	.85	70.00
3	26	20	10	167	1.00	.85	90.00
4	28	22	11	227	1.15	.85	110.00
5	30	24	12	295	1.30	.90	140.00
6	32	26	13	381	1.50	.90	175.00
8	36	28	14	504	1.80	.90	240.00
10	40	30	15	693	2.10	1.00	325.00
12	46	32	16	1130	3.75	1.00	575.00

For each extra foot of hoist, allow 2 feet hand chain and 2 feet main chain.

YALE DUPLEX BLOCKS.

SCREW GEARED.

Capacity in tons.	Price Complete.	Regular Hoist in feet.	Net Weight in lbs.	Extra Hoist, Price per foot.
½	$25 00	8	43	$1 20
1	30 00	8	57	1 50
1½	40 00	8	76	1 75
2	50 00	9	104	2 00
3	75 00	10	200	2 20
4	95 00	10	225	2 40
5	140 00	12	340	3 00
6	180 00	12	360	3 75
8	210 00	12	390	4 00
10	275 00	12	570	4 25

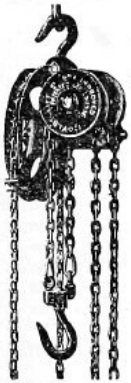
The improved chain guides permit the use of block in a horizontal or inclined position. All working parts encased in oil-tight housing.

YALE WESTON TRIPLEX BLOCKS.

Capacity in tons	Price Complete.	Regular Hoist in feet.	Net Weight in lbs.	Extra Hoist, Price per foot.
½	$35 00	8	54	$0 90
1	45 00	8	89	95
1½	60 00	8	133	1 00
2	70 00	9	203	1 05
3	90 00	10	206	1 50
4	110 00	10	307	1 60
5	140 00	12	397	2 15
6	165 00	12	417	2 15
8	200 00	12	505	2 70
10	240 00	12	622	3 25
12	300 00	12	800	4 30
16	360 00	12	1000	5 40
20	425 00	12	1150	6 50

"GENUINE" HARRINGTON HOISTS.

Double Chain Screw.



Capacity, tons.	Will Lift, feet.	Weight Complete, lbs.	Price Complete.	Extra Lift, per Foot.
¼	8	41	$ 22.50	$1.00
½	8	68	25.00	1.20
1	8	75	30.00	1.50
1½	8	108	40.00	1.75
2	9	160	50.00	2.00
3	10	247	75.00	2.20
4	10	325	95.00	2.40
5	12	483	140.00	3.00
6	12	555	180.00	3.75
8	12	735	210.00	4.00
10	12	785	275.00	4.25

One man can lift the full capacity of each machine.

The blocks have two independent working chains, so the load being carried on two distinct chains instead of one, the possibility of accident is reduced.

For parts see next page.

HARRINGTON KEYSTONE SPUR-GEARED HOIST.

For Rapid Hoisting.

This hoist holds the load at any point, and is equipped with two load chains, same as screw hoist. It will raise a given load twice as fast as the screw hoist.

To Lift, feet.	Capacity, lbs.	Price Complete.	Extra Lift, per Foot.
8	1,000	$ 35.00	$1.20
8	2,000	45.00	1.50
8	3,000	60.00	1.75
9	4,000	70.00	2.00
10	6,000	90.00	2.20
10	8,000	110.00	2.40
12	10,000	140.00	3.00

Sure-Grip Steel Tackle Blocks

INSTRUCTIONS FOR REEVING.

Enter rope at A, pass wedge, and follow arrows as shown in cut. It will be noticed the two centre ropes *coming in contact with wedge* always travel in same direction at same time. Take twist out of rope.

No. 3.—To be used with 3-8 inch rope.
One man can lift.....500 lbs.
Capacity.....600 " $3 00

No. 4.—To be used with 1-2 inch rope.
One man can lift.....550 lbs.
Capacity.....1000 " 5 50

No. 5.—To be used with 5-8 inch rope.
One man can lift.....400 lbs.
Capacity.....1800 " 7 00

No. 6.—To be used with ¾ inch rope.
One man can lift.....450 lbs.
Capacity.....2500 " 8 50

No. 4½.—To be used with 1-2 inch rope.
One man can lift.....600 lbs.
Capacity.....3000 " 10 00

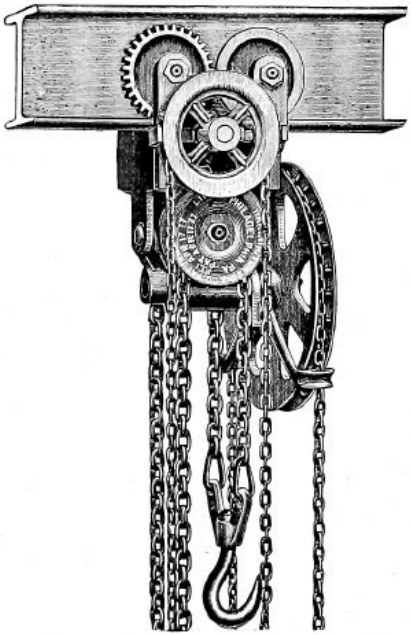
No. 5½.—To be used with 5-8 inch rope.
One man can lift.....700 lbs.
Capacity.....3500 " 12 00

No. 6½.—To be used with 3-4 inch rope.
One man can lift.....850 lbs.
Capacity.....5000 " 14 00

Can supply Overhead Track; also, Trolleys and Hangers for same

COMBINED SCREW HOIST AND GEARED TRAVELER

To Run on Lower Flange of I-beam



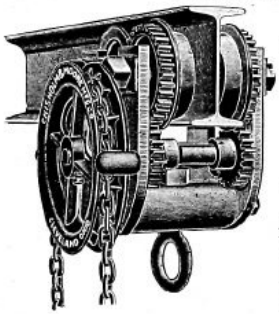
SCREW HOISTS AND TRAVELERS

Capacity	Lift	Size of I-beam	PRICES	
			Plain	Geared
500 lb.	8 ft.	4 in.	$52 50	
1,000 "	8 "	5 "	55 00	
2,000 "	8 "	6 "	65 00	$85 00
3,000 "	8 "	7 "	80 00	100 00
4,000 "	9 "	8 "	95 00	115 00
6,000 "	10 "	9 "	135 00	155 00
8,000 "	10 "	10 "	175 00	195 00
10,000 "	12 "	12 "	240 00	260 00
12,000 "	12 "	15 "	300 00	320 00
16,000 "	12 "	20 "	360 00	390 00
20,000 "	12 "	24 "	455 00	485 00

KEYSTONE HOISTS and TRAVELERS

Capacity	Lift	PRICES	
		Plain	Geared
1,000 lbs.	8 ft.	$65 00	
2,000 "	8 "	80 00	$100 00
3,000 "	8 "	100 00	120 00
4,000 "	9 "	115 00	135 00
6,000 "	10 "	150 00	170 00
8,000 "	10 "	190 00	210 00
10,000 "	12 "	240 00	260 00

GEARED AND PLAIN YOKE TROLLEYS.

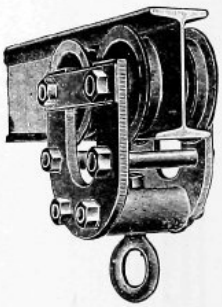


Geared Trolley.

FORGED FRAME, FOUR WHEELS, STEEL ROLLER BUSHED.

Adjustable to any size I Beam.

CAPACITY.	GEARED	PLAIN
No. 2— 2,000 lbs	$32.00	$21.00
" 3— 3,000 "	34.00	22.50
" 4— 4,000 "	36.00	24.00
" 6— 6,000 "	43.00	28.00
" 8— 8,000 "	48.00	32.00
" 10—10,000 "	53.00	36.00
" 12—12,000 "	60.00	42.00
" 16—16,000 "	70.00	51.00
" 20—20,000 "	80.00	61.00

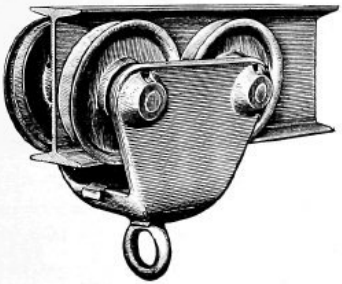


Plain Trolley.

In ordering please state size and weight of I Beam for which the trolley is intended.

CAST IRON TROLLEYS.

These can only be used on the Standard beam of the weight specified.



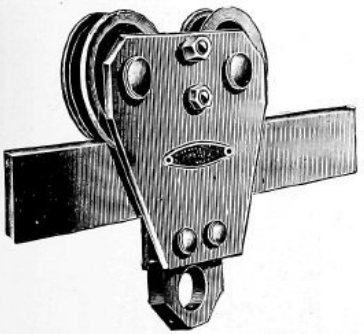
WITH PLAIN BEARINGS.

Capacity in Tons.	Size of I-Beam.	Price.
½	5 in.– 9¾ lb.	$18 00
1	6 " –12¼ "	20 00
1½	7 " –15 "	25 00
2	7 " –15 "	25 00
2	8 " –18 "	30 00
WITH ROLLER BEARINGS.		
1	6 in.–12¼ lb.	$25 00
1½	7 " –15 "	30 00
2	8 " –18 "	35 00
3	9 " –21 "	40 00

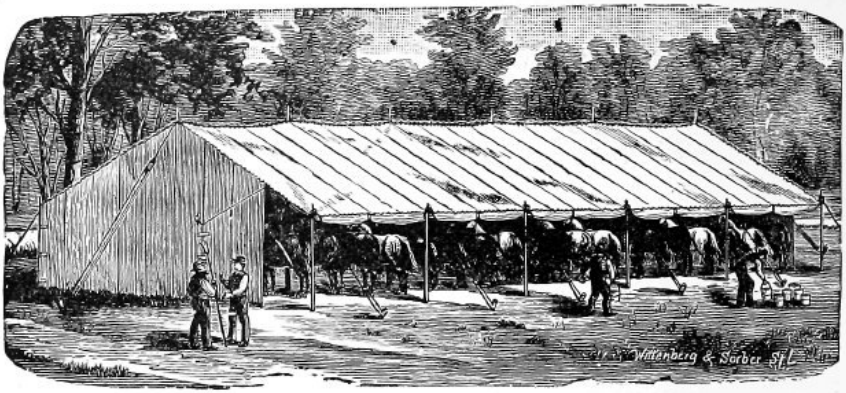
BROWN FLAT RAIL TROLLEYS.

To Run on Flat Steel Bars.

The "Plain" trolley is shown in the cut. The "Geared" trolley is fitted with hand chain and sprocket wheel for trolley travel.

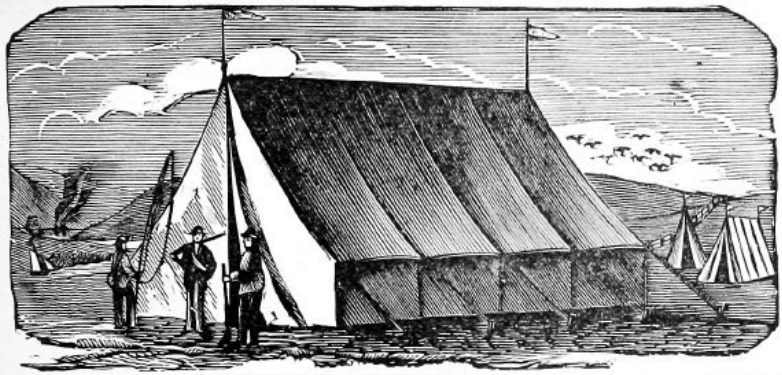


Capacity in Tons.	Size of Rail in inches.	Greatest Distance between Hangers.	Price of Trolleys.	
			Plain.	Geared.
¼	3x½	6 ft.	$15 00	$30 00
½	3x½	5 "	15 00	30 00
1	4x¾	6 "	20 00	35 00
1½	4x¾	5 "	20 00	35 00
2	4x¾	4 "	20 00	35 00
3	6x1	6 "	25 00	40 00
4	6x1	5 "	25 00	40 00



STABLE TENTS.

Size.	Height of Wall, Feet.	Height of Pole, Feet.	10-oz. Double Filling, or 8-oz. Army Duck.	12-oz. Double Filling, or 10-oz. Army Duck.	12-oz. Army Duck, or No. 10.	15-oz. Army Duck, or No. 8.
24 x 21	5	12	$104 00	$117 00	$130 00	$160 00
24 x 24	5	12	112 00	126 00	140 00	172 00
24 x 28	5	12	127 00	143 00	159 00	195 00
24 x 33	5	12	142 00	160 00	178 00	218 50
24 x 35	5	12	150 00	169 00	187 50	230 50
24 x 37	5	12	157 50	177 00	196 50	241 50
24 x 42	5	12	173 00	194 50	216 50	265 50
24 x 47	5	12	188 50	212 50	236 00	290 00
24 x 51	5	12	204 50	230 00	255 50	314 00
24 x 56	5	12	219 50	247 00	274 50	337 00
24 x 60	5	12	234 50	264 00	293 50	360 50
24 x 63	5	12	242 00	272 00	302 50	371 50
24 x 65	5	12	250 00	281 00	312 00	383 50
24 x 70	5	12	265 00	298 00	331 00	407 00
24 x 72	5	12	273 50	307 50	341 50	419 50
24 x 75	5	12	280 50	315 50	350 50	431 00
26 x 21	5	12½	111 50	125 50	139 50	171 00
26 x 24	5	12½	120 00	135 00	150 00	184 00
26 x 28	5	12½	135 50	152 50	169 50	208 00
26 x 33	5	12½	152 00	170 50	189 50	233 00
26 x 35	5	12½	159 50	179 50	199 50	245 00
26 x 37	5	12⅝	168 00	189 00	210 00	258 00
26 x 42	5	12⅝	184 00	207 50	230 50	283 00
26 x 47	5	12⅝	200 50	225 50	250 50	308 00
26 x 51	5	12⅝	216 00	243 00	270 00	332 00
26 x 56	5	12⅝	232 50	261 50	290 50	357 00
26 x 60	5	12½	248 50	279 50	311 00	382 00
26 x 63	5	12½	257 00	289 00	321 50	394 50
26 x 65	5	12½	264 50	297 50	330 50	406 00
26 x 70	5	12½	281 00	316 50	351 50	431 50
26 x 72	5	12½	289 00	325 00	361 00	444 00
26 x 75	5	12½	297 00	334 00	371 00	456 00
26 x 82	5	12½	321 00	361 00	401 00	493 00
26 x 84	5	12½	329 50	370 50	411 50	505 50
26 x 91	5	12⅝	353 50	397 50	441 50	542 50
28 x 21	5	13	119 75	134 75	149 75	184 00
28 x 24	5	13	128 25	144 25	160 25	197 00
28 x 28	5	13	145 00	163 25	181 25	222 75
28 x 33	5	13	163 00	183 25	203 75	250 25
28 x 35	5	13	170 75	192 25	2 3 50	262 25
28 x 37	5	13	179 25	201 50	224 00	275 25
28 x 42	5	13	196 50	221 25	245 75	302 00
28 x 47	5	13	213 50	240 00	266 75	327 50
28 x 51	5	13	230 25	2 9 00	287 75	353 50
28 x 56	5	13	247 50	278 50	309 50	380 00
28 x 60	5	13	265 00	298 00	331 00	406 75



WALL TENTS.

Size, Feet.	Height of Pole Feet.	Height of Wall Feet.	8-oz. Duck, Single Filling.	10-oz. Duck, Single Filling.	10-oz. Duck, Double and Twisted Filling or 8-oz Army Duck.	12-oz Duck, Double and Twisted Filling or 10-oz. Army Duck.	12-oz. Army Duck, or No. 10.	15-oz. Army Duck, or No. 8.
7 x 7	7	3	$ 8 00	$ 9 35	$10 35	$12 25	$14 55	$17 50
7 x 9	7	3	9 50	11 05	12 30	14 60	17 40	20 90
9 x 9	7½	3	10 95	12 80	14 30	17 00	20 30	24 50
9½ x 12	7½	3	12 90	15 05	16 80	19 95	23 80	28 70
9½ x 14	7½	3	14 65	17 10	19 10	22 65	27 05	32 55
12 x 12	8	3½	15 80	17 95	20 00	23 75	28 40	34 25
12 x 14	8	3½	17 30	20 20	22 55	26 80	32 05	38 60
12 x 16	8	3½	19 20	22 45	25 05	29 80	35 65	43 00
12 x 18	8	3½	21 35	24 95	27 80	33 00	39 45	47 50
14 x 14	9	4	20 60	24 15	26 95	32 10	38 45	46 45
14 x 16	9	4	22 70	26 65	29 80	35 50	42 55	51 35
14 x 18	9	4	25 35	29 75	33 20	39 45	47 30	57 10
14 x 20	9	4	28 20	32 75	36 40	43 00	51 15	61 40
14 x 24	9	4	31 80	36 90	41 00	48 10	57 25	68 75
16 x 16	11	5	28 20	33 10	37 15	44 10	53 05	64 25
16 x 18	11	5	30 95	36 40	40 75	48 25	58 00	70 20
16 x 20	11	5	34 10	39 80	44 30	52 15	62 30	75 00
16 x 24	11	5	38 85	45 20	50 25	59 05	70 40	84 65
16 x 30	11	5	47 00	54 75	60 85	71 50	85 30	102 60
16 x 35	11	5	52 60	61 30	68 10	80 20	95 60	114 95
18 x 18	11	5	35 40	41 00	46 45	55 20	66 20	79 95
18 x 20	11	5	39 00	45 45	50 50	59 70	71 10	85 45
18 x 24	11	5	43 60	50 85	56 50	66 50	79 25	95 25
18 x 30	11	5	52 25	60 90	67 75	79 95	95 35	114 65
18 x 35	11	5	58 15	67 80	75 40	89 05	106 25	127 75

WALL TENTS, ROPED.

Size, Feet.	Height of Pole Feet.	Height of Wall Feet.	8-oz. Duck, Single Filling.	10-oz. Duck, Single Filling.	10-oz. Duck, Double and Twisted Filling, or 8 oz Army Duck.	12-oz. Duck, Double and Twisted Filling, or 10-oz. Army Duck.	12-oz. Army Duck, or No. 10.	15-oz. Army Duck, or No. 8.
21 x 30	11	5	$ 89 00	$101 00	$113 00	$127 50	$141 50	$173 50
21 x 35	11	5	104 50	118 50	132 50	149 50	166 00	204 00
21 x 40	11	5	115 00	130 50	146 00	164 50	182 50	224 50
21 x 49	11	5	136 00	154 50	173 00	194 50	216 50	265 50
24 x 28	13	6	105 50	120 00	134 50	151 00	168 00	206 50
24 x 35	13	6	125 50	142 00	159 00	179 00	199 00	244 00
24 x 42	13	6	144 50	164 00	183 50	206 50	229 50	282 00
24 x 51	13	6	169 50	192 50	215 50	242 50	269 50	331 00
24 x 60	13	6	195 00	221 50	248 00	279 00	310 00	381 00
24 x 65	13	6	207 50	236 00	264 50	297 50	330 50	406 00
30 x 37	15	6	160 00	182 00	204 00	229 50	255 00	313 00
30 x 42	15	6	175 00	199 00	223 00	250 50	278 50	342 50
30 x 47	15	6	189 50	215 50	241 50	271 50	301 50	370 50
30 x 51	15	6	204 00	232 00	260 00	292 50	325 00	399 00
30 x 56	15	6	219 00	249 00	279 00	313 50	348 50	428 50
30 x 60	15	6	233 50	265 50	297 50	334 50	371 50	456 50
30 x 65	15	6	248 50	282 50	316 50	356 00	395 50	486 00
30 x 70	15	6	263 00	299 00	335 00	376 50	418 50	514 50

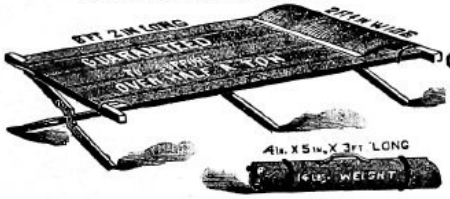
PLAIN WHITE CANVAS PAULINS.

For Covering Harvesters, Binders, Threshing Machines, Stacks, Hay Cars and all kinds of Merchandise.

Size, Feet.	8-oz. Duck	10-oz. Duck.	12-oz. Duck.	13-oz. Duck.	15-oz. Duck.	18-oz. Duck.	20-oz. Duck.
5¼ x 9				$3 80	$4 20	$4 80	$5 10
5½ x 12				5 05	5 60	6 40	6 95
7 x 12				6 45	7 15	8 15	8 70
7 x 15				8 05	8 95	10 15	10 85
10 x 16	$3 90	$4 80	$7 45	12 30	13 60	15 50	16 55
10 x 17	4 15	5 10	7 90	13 05	14 45	16 45	17 60
10 x 18	4 40	5 40	8 40	13 80	15 30	17 40	18 60
12 x 14	4 25	5 25	8 10	12 90	14 30	16 25	17 35
12 x 16	5 00	6 00	9 30	14 75	16 35	18 55	19 85
12 x 18	5 50	6 75	10 45	16 55	18 35	20 90	22 30
12 x 20	6 15	7 50	11 65	18 40	20 40	23 20	24 80
14 x 16	6 50	7 95	11 20	17 20	19 05	21 65	23 15
14 x 18	7 30	8 95	12 60	19 35	21 40	24 35	26 05
14 x 20	8 15	9 95	14 00	21 50	23 80	27 10	28 95
14 x 22	8 95	10 95	15 40	23 60	26 20	29 80	31 80
14 x 24	9 75	11 95	16 80	25 75	28 55	32 50	34 75
16 x 16	7 45	9 10	12 80	19 65	21 75	24 75	26 45
16 x 18	8 35	10 25	14 40	22 10	24 50	27 85	29 75
16 x 20	9 30	11 35	16 00	24 55	27 20	30 95	33 10
16 x 22	10 20	12 50	17 60	27 00	29 95	34 00	36 40
16 x 24	11 15	13 65	19 20	29 45	32 65	37 15	39 70
16 x 26	12 05	14 80	20 80	31 90	35 35	40 20	43 00
16 x 28	13 00	15 90	22 40	34 35	38 10	43 30	46 30
16 x 30	13 95	17 05	24 00	36 80	40 80	46 40	49 60
18 x 20	10 45	12 80	18 00	27 60	30 60	34 80	37 20
18 x 22	11 50	14 05	19 80	30 35	33 65	38 30	40 90
18 x 24	12 55	15 35	21 60	33 10	36 75	41 75	44 65
18 x 26	13 60	16 60	23 40	35 90	39 80	45 25	48 35
18 x 28	14 65	17 90	25 20	38 65	42 85	48 75	52 10
18 x 30	15 65	19 20	27 00	41 40	45 90	52 20	55 80
18 x 32	16 70	20 45	28 80	44 15	48 95	55 70	59 50
18 x 36	18 80	23 00	32 40	49 70	55 10	62 65	66 95
18 x 38	19 85	24 30	34 20	52 45	58 15	66 10	70 70
18 x 40	20 90	25 60	36 00	55 20	61 20	69 60	74 40
20 x 24	13 95	17 05	24 00	36 80	40 80	46 40	49 60
20 x 30	17 40	21 30	30 00	46 00	51 00	58 00	62 00
20 x 36	20 90	25 55	36 00	55 20	61 20	69 60	74 40
20 x 40	23 20	28 40	40 00	61 35	68 00	77 35	82 65
24 x 30	20 90	25 55	36 00	55 20	61 20	69 60	74 40
24 x 36	25 10	30 70	43 20	66 25	73 45	82 50	89 30
24 x 40	27 85	34 10	48 00	73 60	81 60	92 80	99 20
24 x 50	34 80	42 60	60 00	92 00	102 00	116 00	124 00

FOLDING CAMP FURNITURE.

FOLDING CAMP BED.



No. 500. Folding Camp Beds.....per doz. $40 00
Less than dozen lots.....each, 4 00

FOLDING CAMP STOOL.

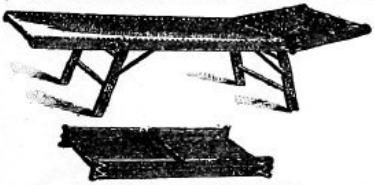
No. 546. 9-oz. Plain white canvas seat, per doz $4.80

No. 547. 10-oz. Plain white or fancy striped canvas seats, per doz., $5.50

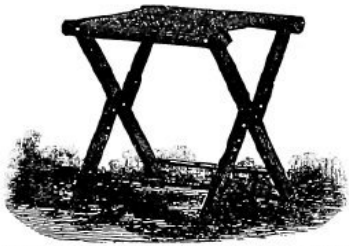
Made of Solid Oak, finished natural. Substantially built.

"OUR STANDARD" WIRE MATTRESS COT.

No. 525. 2 feet 6 inches wide, weight each 28 pounds.....each, $2 70
No. 526. 3 feet wide, weight each 30 pounds, each.....3 00
No. 527. 3 feet 6 inches wide, weight each 35 pounds.....each, 4 00
No. 528. 4 feet wide, weight each 42 pounds, each.....5 40



FOLDING CAMP STOOL.



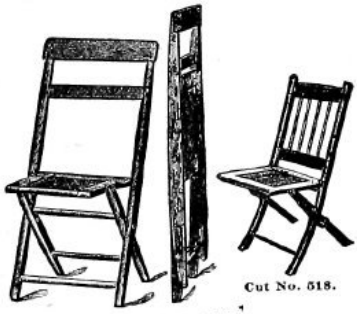
No. 510. Folding Camp Stool.....per doz. $6 00
Each.....60
No 511. Folding Camp Stool with Back.....per doz. 9 00
Each.....1 00
No. 512. Folding Camp Stool, back and seat of Brussels carpet.....per doz. 13 00
Each.....1 50

PLAIN ARMY COT.

Folding, With Inclined Head.

No. 532. 6 feet 3 inches long by 2 feet 5 inches wide, weight 15 pounds, frame of best hardwood, canvas, 15 oz. waterproof duck, all castings made of best malleable iron, each.....$3 75

FOLDING SLAT SEAT CHAIR.

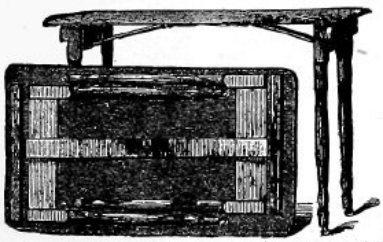


Cut No. 518.

Cut No. 517. Weight about 7 lbs.

No. 517. Oil Finished.....per doz. $11 00
Each.....1 10
No. 518. Oil finished, Our Midget, for Kindergarten etc., height of seat 12 in., height of back 27 in.....per doz. 11 00
Each.....1 10

FOLDING CAMP TABLE.



No. 545. Size 18x36, Highly Polished, per doz. $15 00
Less than dozen lots.....each, 1 50

GASOLINE OR OIL TORCHES.

Valuable for lighting Factories, Docks, Blacksmith Shops, Markets, Camps, Foundries, etc.

PRICES.

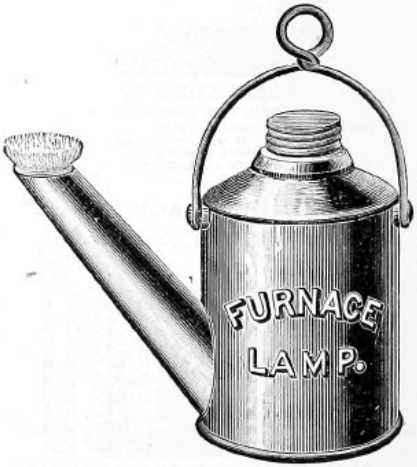
Single Flame, as per illustration.....per doz., $24 00
Double " one tank only..... " 42 00

Two, three and five gallon Torches furnished on short notice.

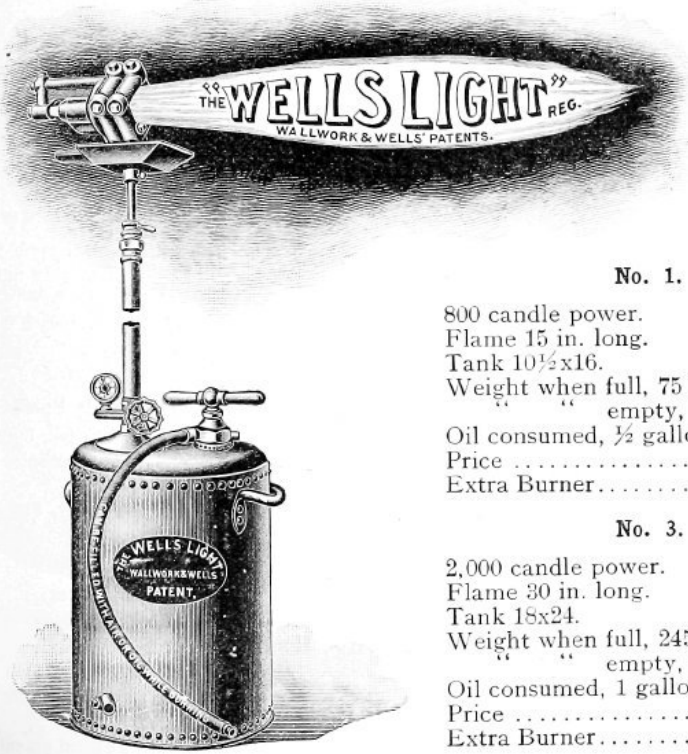
These Torches ought not to be confused with the common gasoline torches, as the burners on this line of goods are a marvel of workmanship at the price sold.

FURNACE LAMPS.

No. 1. Holding 3 pints,	per doz.,	$12 00
No. 2. " 2 "	"	10 50
Extra Wicks No. 1...	"	55
" " No. 2...	"	30
Zinc Caps	"	50



THE "WELLS LIGHT."



ABSOLUTELY FREE FROM DANGER,

Giving a clear white light, without smoke or spray; is not dazzling, and does not throw intense shadows like the electric light.

No. 1.

800 candle power.
Flame 15 in. long.
Tank 10½x16.
Weight when full, 75 lbs.
" " empty, 45 lbs.
Oil consumed, ½ gallon per hour.
Price .....net, $75 00
Extra Burner..... " 10 00

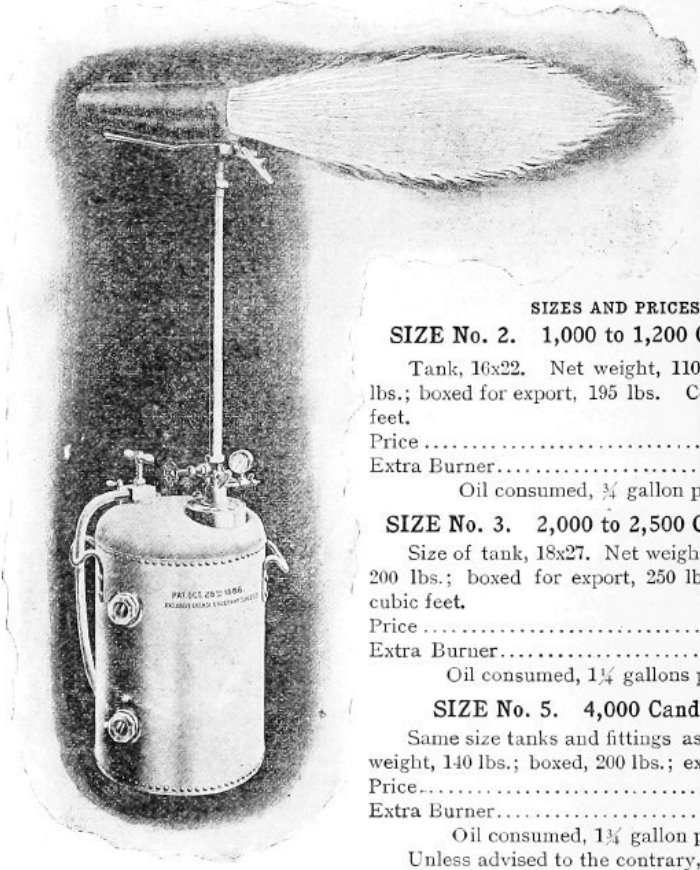
No. 3.

2,000 candle power.
Flame 30 in. long.
Tank 18x24.
Weight when full, 245 lbs.
" " empty, 110 lbs.
Oil consumed, 1 gallon per hour.
Price .....net, $100 00
Extra Burner..... " 12 00

No. 5.

4,000 candle power.
Flame 36 in. long.
Tank 18x24.
Weight when full, 245 lbs.
" " empty, 110 lbs.
Oil consumed, 1½ gallons per hour.
Price .....net, $110 00
Extra Burner..... " 20 00

THE BUCKEYE LIGHT



Is used largely by **Railroads** and **Contractors** for Wrecking Outfits and **Construction Work, Steam Shovels,** Dredging, **Steel Work,** etc.

Casts No Strong Shadows.

Unaffected by Wind or Rain.

Portable and Complete in Itself.

AUTOMATIC.

SIZES AND PRICES.

SIZE No. 2. 1,000 to 1,200 Candle Power.

Tank, 16x22. Net weight, 110 lbs.; boxed, 160 lbs.; boxed for export, 195 lbs. Contents, 12 cubic feet.

Price ..... net, $75 00
Extra Burner ..... " 9 00

Oil consumed, ¾ gallon per hour.

SIZE No. 3. 2,000 to 2,500 Candle Power.

Size of tank, 18x27. Net weight, 135 lbs.; boxed, 200 lbs.; boxed for export, 250 lbs. Contents, 16 cubic feet.

Price ..... net, $100 00
Extra Burner ..... " 12 50

Oil consumed, 1¼ gallons per hour.

SIZE No. 5. 4,000 Candle Power.

Same size tanks and fittings as No. 3 size. Net weight, 140 lbs.; boxed, 200 lbs.; export, 250 lbs.

Price ..... net, $110 00
Extra Burner ..... " 20 00

Oil consumed, 1¾ gallon per hour.

Unless advised to the contrary, we send an extra Burner with each Light, and make charge for same.

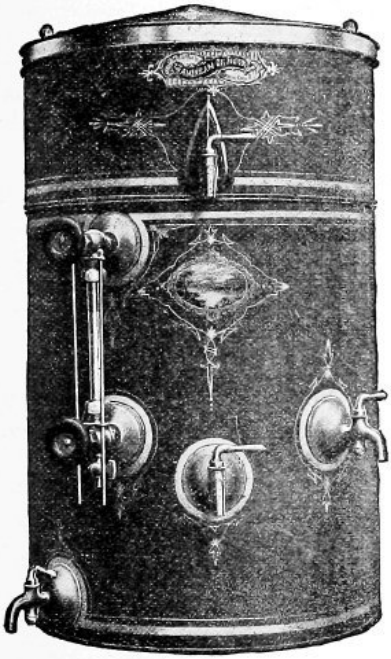
JUMBO SIZE. Flame about 5,000 Candle Power.

Size of tank, 24x32. Net weight, 230 lbs.; boxed, 320 lbs.; boxed for export, 385 lbs. Contents, 18 cubic feet.

Price ..... net, $175 00
Extra Burner ..... " 25 00

Valuable where a large, powerful light is required. Oil consumed, about 2 gallons per hour.

CROSS OIL FILTER AND PURIFIER.



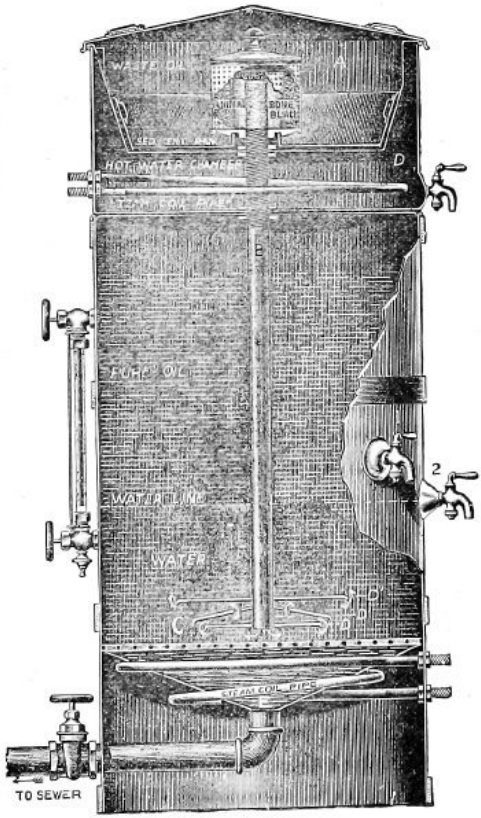
PRICES. Net, F. O. B. Factory.

	Filtering capacity, gallons per day.			
No. 1.....	15	to	20.....	$ 29 50
No. 2.....	3	"	5.....	19 50
No. 3.....	30	"	40.....	60 00
No. 4.....	50	"	60.....	75 00
No. 5.....	70	"	90.....	90 00
No. 6.....100		"	120.....	120 00
No. 7.....120		"	150.....	140 00
No. 8.....150		"	200.....	200 00
No. 9.....200		"	250.....	250 00
No. 10.....250		"	300.....	300 00
No. 11.....300		"	400.....	400 00
No. 12.....400		"	500.....	500 00

The capacity of a filter depends upon the heaviness of the oil to be filtered. The above figures are the minimum and maximum capacities for the heaviest and thinnest oils.

Construction.

The accompanying illustrations show the arrangement of the various parts. The filter is made of extra heavy galvanized iron, all joints soldered, lapped and riveted. It is neatly painted, handsomely decorated in gold—an ornament to the engine room. All inside work rigidly braced and reinforced. Strongly and enduringly built.



RAILROAD HAND CARS.

On the following pages we show our line of Hand Cars, Push Cars, Inspection Cars and Velocipedes.

Our Cars are equipped with

Roller or Brass Bearings,

Tapered or Straight Axles,

Iron Parts without a weld.

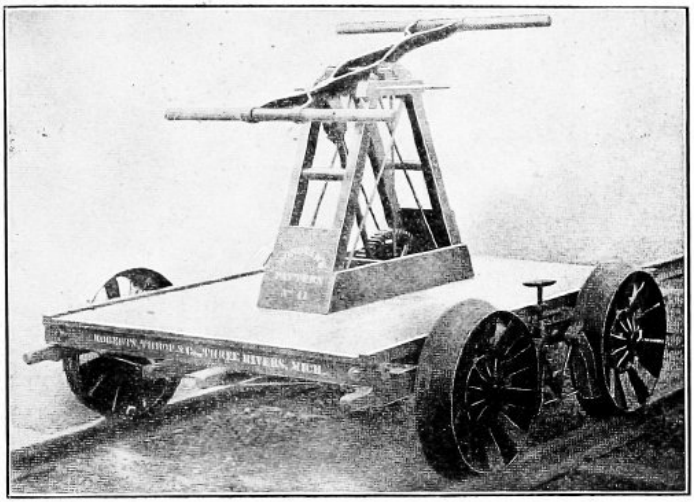
Wheels Insulated if required.

DONOVAN IMPROVED PRESSED STEEL WHEEL.

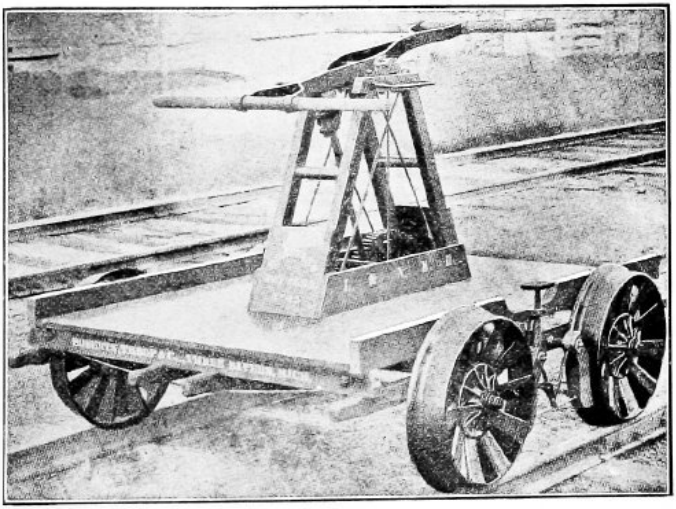
It is without Rivets or Bolts.

It is made from one piece of steel, passing through a series of processes until the proper shape is obtained, giving the greatest amount of strength to the given amount of material.

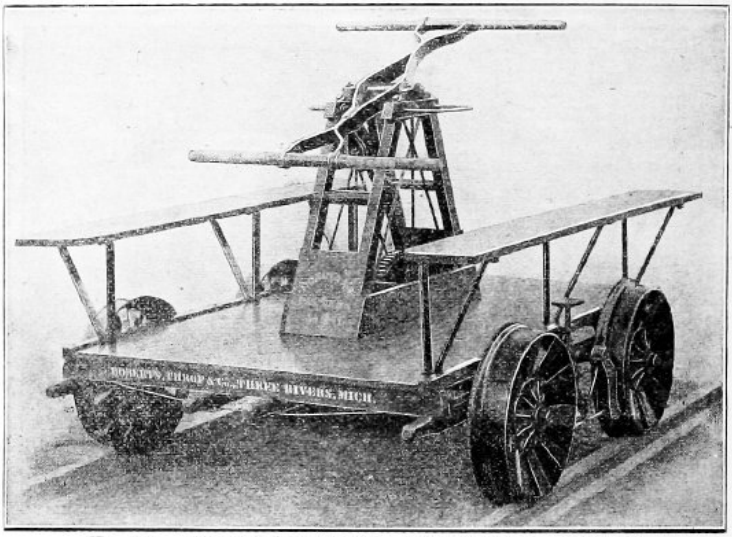
The metal, which has heretofore been cut away in the different types of pressed steel wheels, is in the DONOVAN wheel cut on one side and both ends and bent at right angles, and, the center being dished, a lateral brace is formed, which is pressed tightly against the tread, giving strength between the hub and tread, making a perfect support, obviating all tendency to spring or crack, and preventing any ringing sound when in operation.



No. 41. Standard Section Hand Car—The Donovan Pattern
Shipping Weight, 500 lbs.

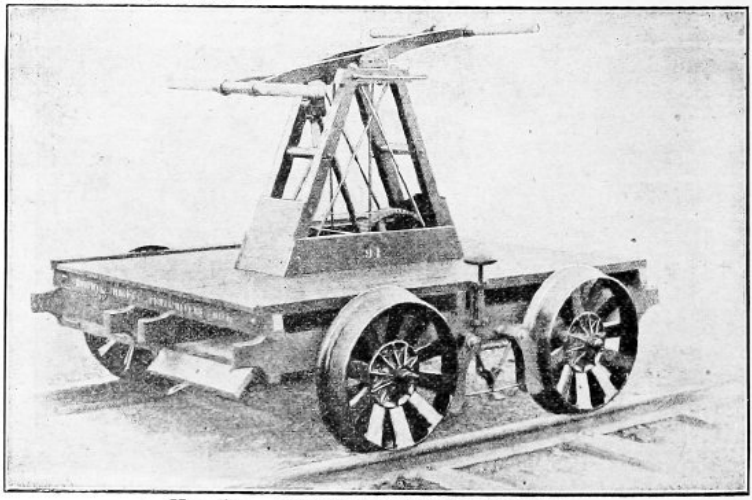


No. 45. Standard Section Hand Car—The Donovan Pattern.
Shipping Weight, 500 lbs.



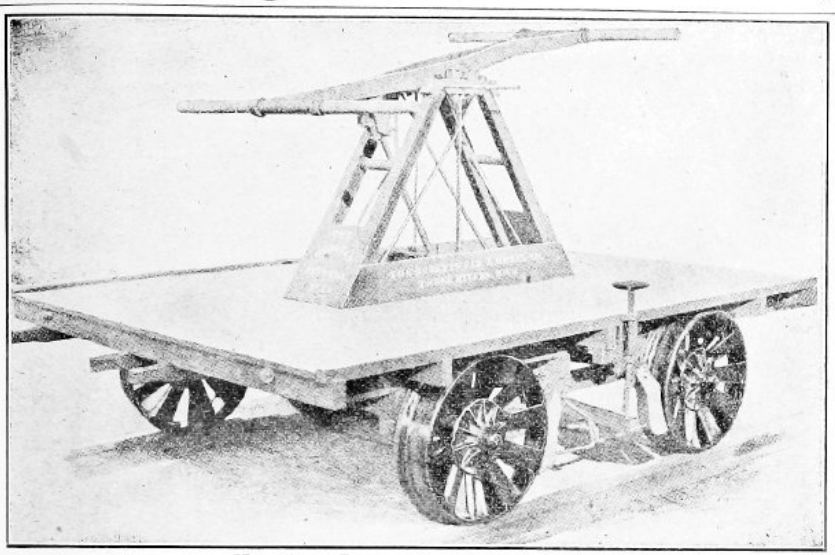
No. 46. Special Hand Car—The Donovan Pattern.

Standard gauge; platform, 6 feet long by 4 feet 4 inches wide; removable side seats; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 600 lbs.



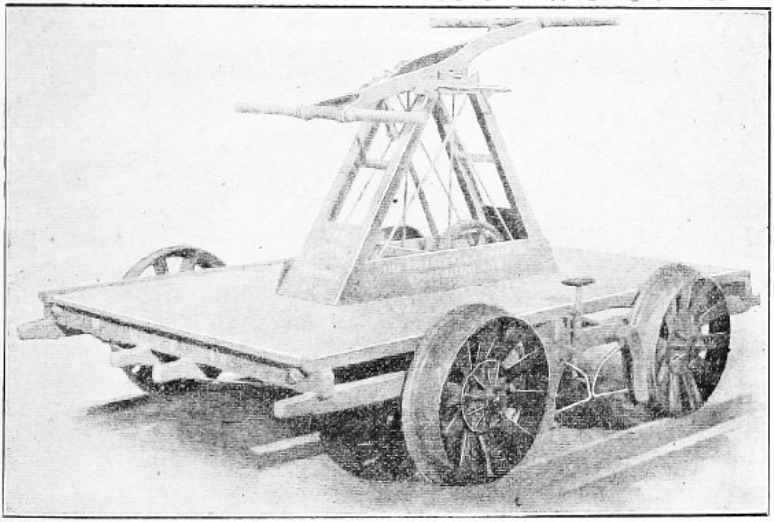
No. 50. Standard Section Hand Car.

Standard gauge; platform, 6 feet long by 4 feet 4 inches wide; tool boxes underneath; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 600 lbs.



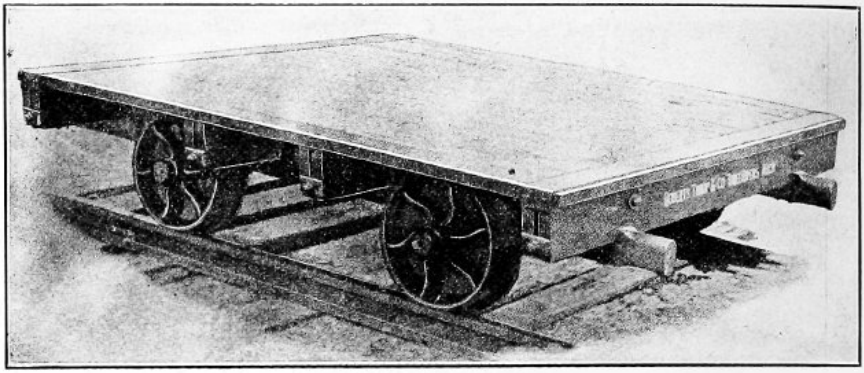
No. 51. Bridge Gang Hand Car.

Standard gauge; platform, 8 feet long by 5 feet 6 inches wide; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 600 lbs.



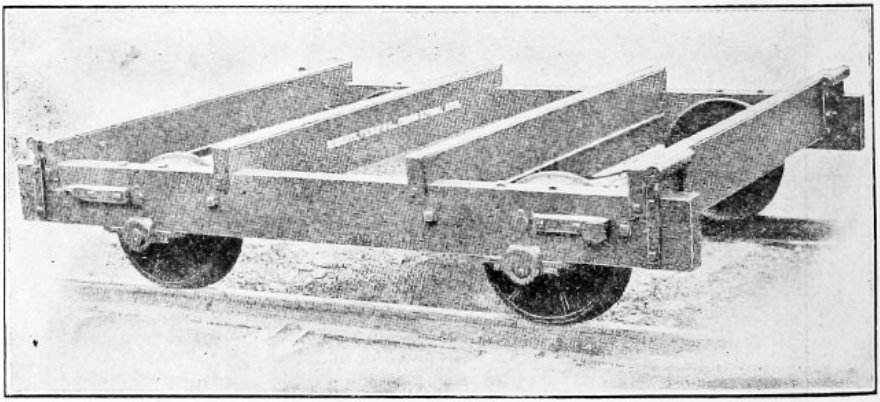
No. 40. Special Hand Car.

Standard gauge; platform, 7 feet 6 inches long by 4 feet 4 inches; extra trussing; iron parts without a weld; geared to 86⅔; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 600 lbs.



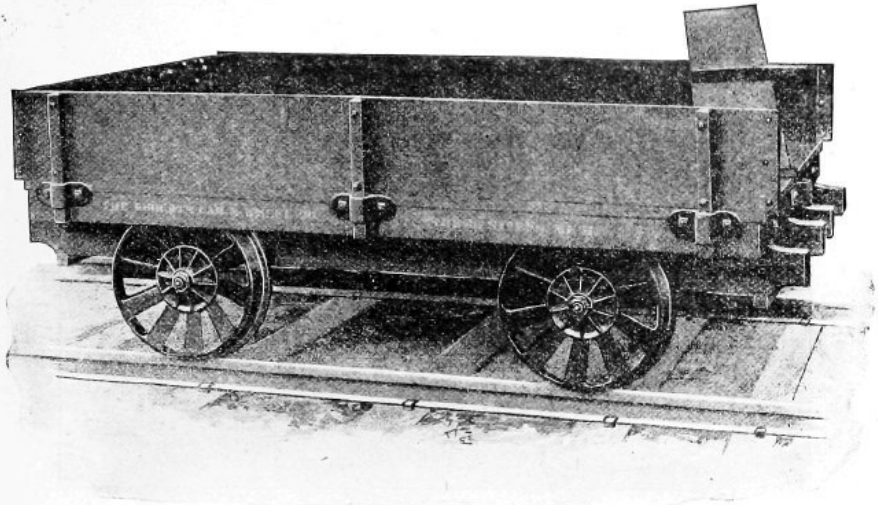
No. 21. Extra Heavy Push Car.

Standard gauge; platform, 8 feet long by 5 feet 6 inches wide; cast-iron wheels 16 inches in diameter, with 4 inch chilled tread; steel axles 2 inches in diameter; babbitted boxes. Furnished to suit any gauge. Shipping weight, 1,100 lbs.



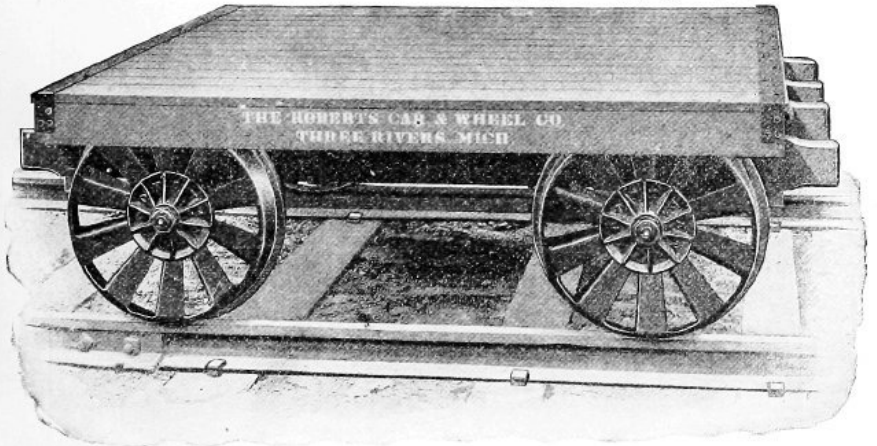
No. 20. Track-Laying Car.

Standard gauge; measurement of car over sills, 7 feet 8 inches by 6 feet 3 inches; cast-iron wheels 16 inches in diameter, with 6 inch chilled tread; steel axles 3 inches in diameter; babbitted boxes; fitted with tool box, steel rollers and draw hooks at each corner, and cross-sills plated with iron. Furnished to suit any gauge. Shipping weight, 1,100 lbs.



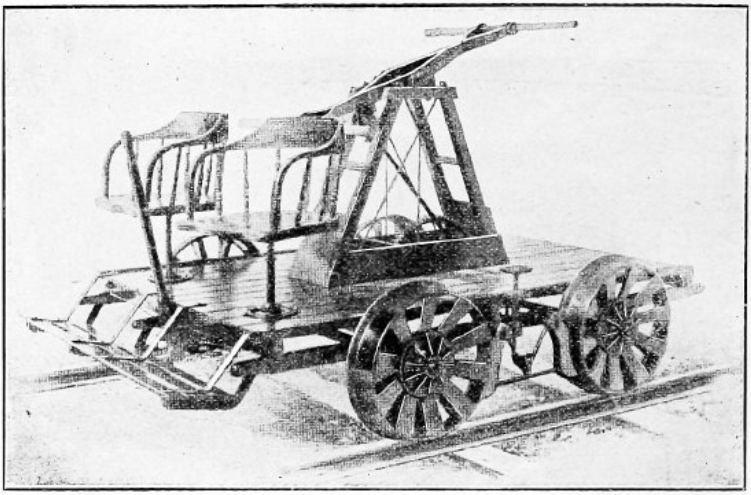
No. 15. Handy Push Car—The Donovan Pattern.

Standard gauge; platform, 8 feet long by 5 feet 6 inches wide; four handles at each end; removable side and end boards, 12 inches wide; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 700 lbs.



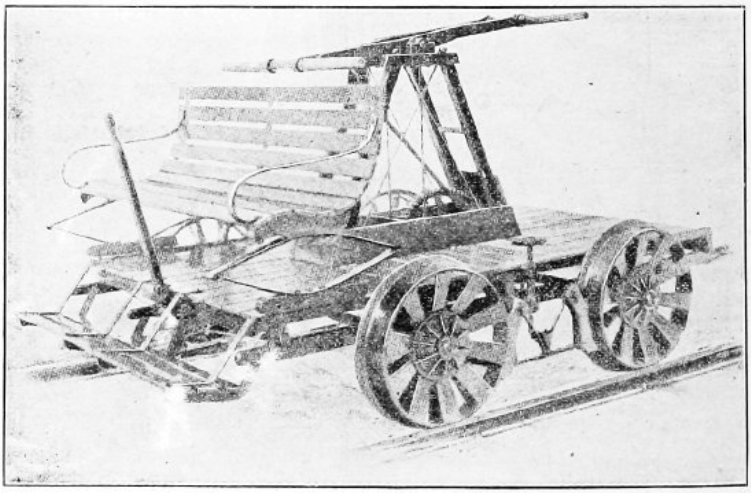
No. 42. Standard Section Push Car—The Donovan Pattern.

Standard gauge; platform, 6 feet long by 5 feet 6 inches wide; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Equipped with **roller bearings,** affording such great ease that one man can handle a loaded car as easily as two men can with ordinary bearings. Furnished to suit any gauge. Shipping weight, 500 lbs.



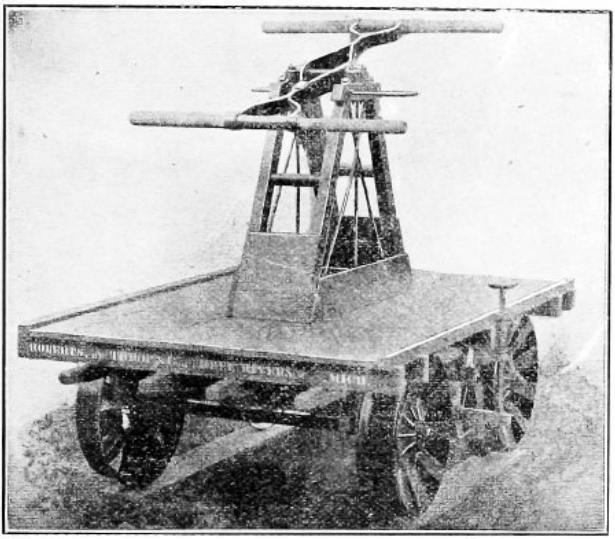
No. 52. Standard Inspection Car.

Standard gauge; platform, 7 feet long by 4 feet 4 inches wide; revolving spring chairs; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 550 lbs.



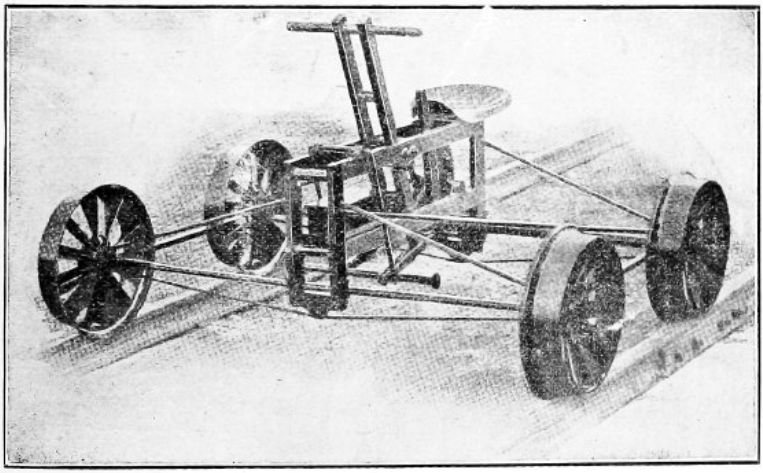
No. 53. Standard Inspection Car.

Standard gauge; platform, 7 feet long by 4 feet 4 inches wide; iron parts without a weld; pressed steel wheels, 20 inches in diameter. Furnished to suit any gauge. Shipping weight, 550 lbs.



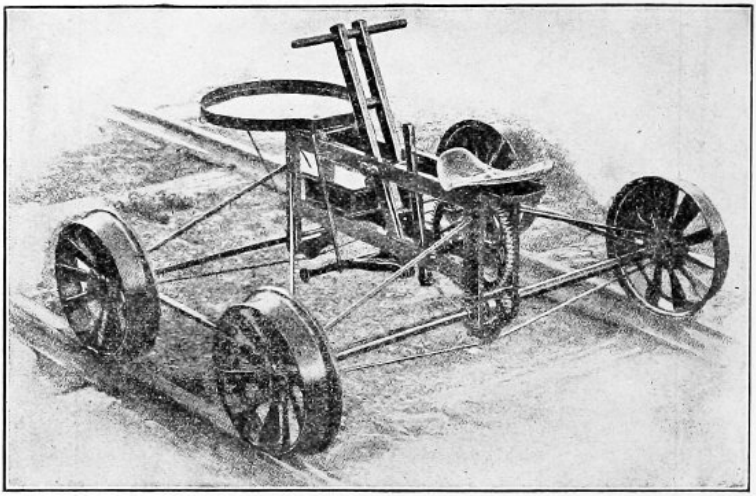
No. 49. Narrow-Gauge Section Hand Car—The Donovan Pattern.

Platform, 6 feet long by 4 feet wide; pressed steel wheels, 20 inches in diameter. Shipping weight, 500 lbs.



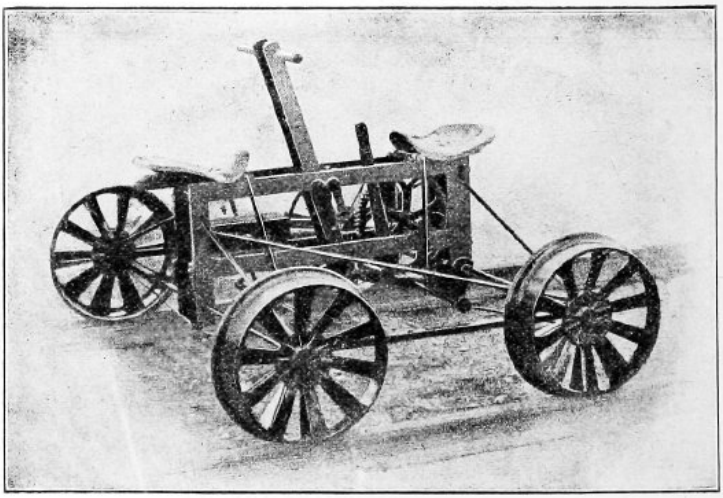
No. 23. "Eclipse" Car.

Standard gauge; one seat; pressed steel wheels, 16 inches in diameter. Furnished to suit any gauge. Shipping weight, 150 lbs.



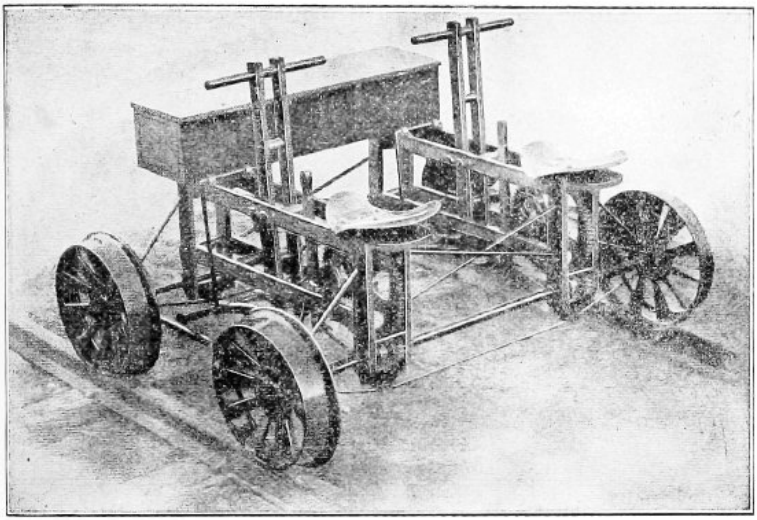
No. 24. "Eclipse" Car.

Standard gauge; one seat; lamp table; pressed steel wheels, 16 inches in diameter. Furnished to suit any gauge. Shipping weight, 150 lbs.



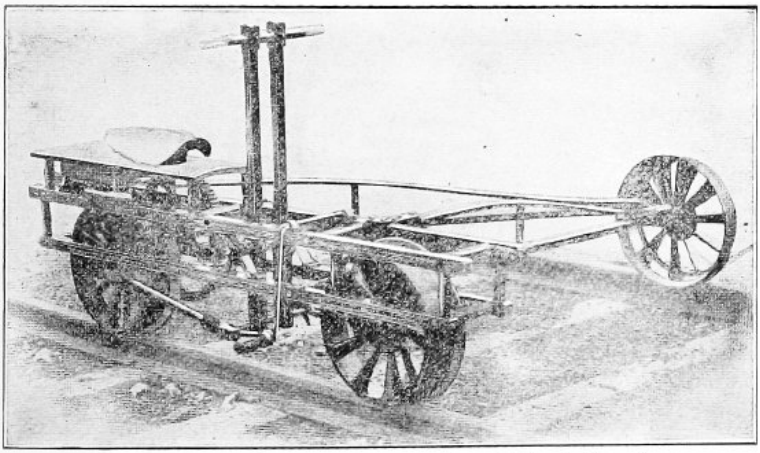
No. 25. "Eclipse" Car.

Standard gauge; two seats; pressed steel wheels, 16 inches in diameter. Furnished to suit any gauge. Shipping weight, 150 lbs.



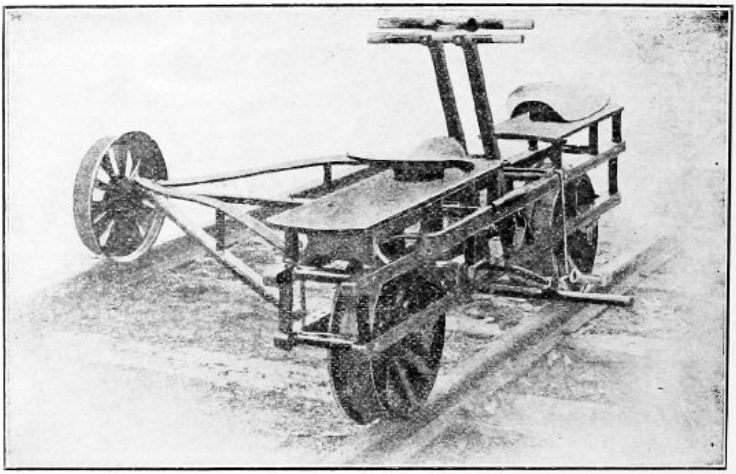
No. 27. "Eclipse" Car.

Standard gauge; two seats; double frame with tool box for telegraph or other repairs; pressed steel wheels, 16 inches in diameter. Furnished to suit any gauge not less than 3 feet. Shipping weight, 200 lbs.



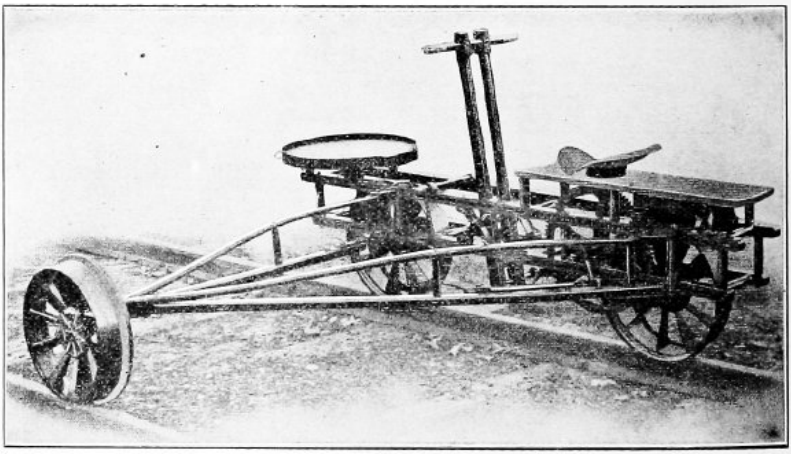
No. 1. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



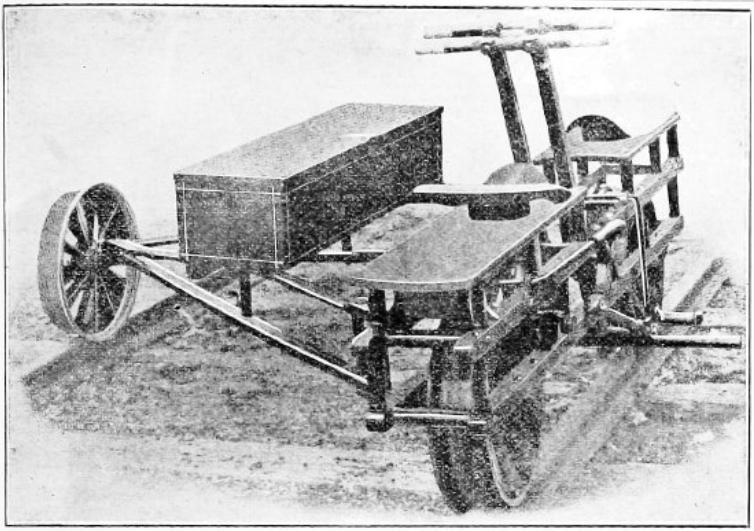
No. 2. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



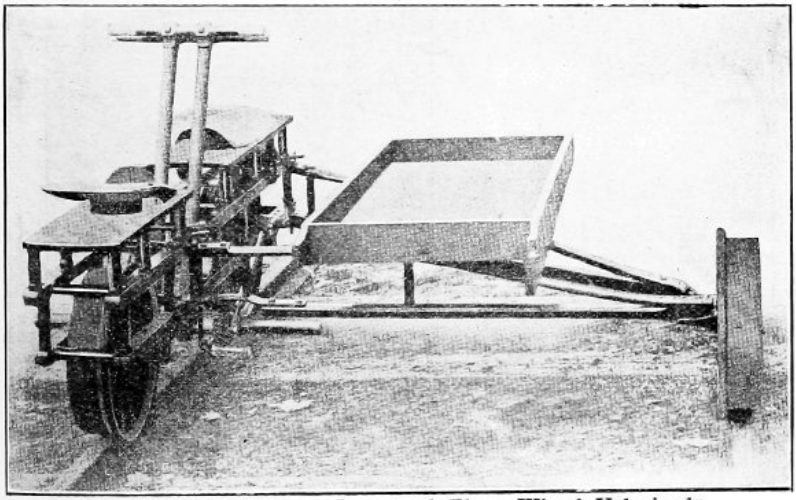
No. 3. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; lamp table; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



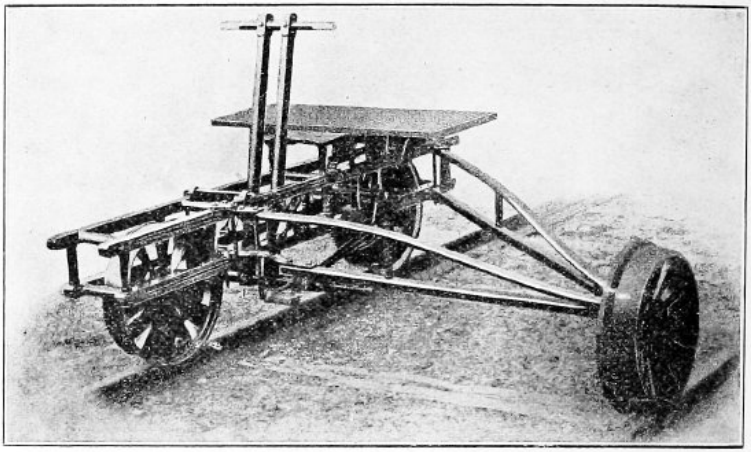
No. 4. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; tool box for telegraph or other repairs; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



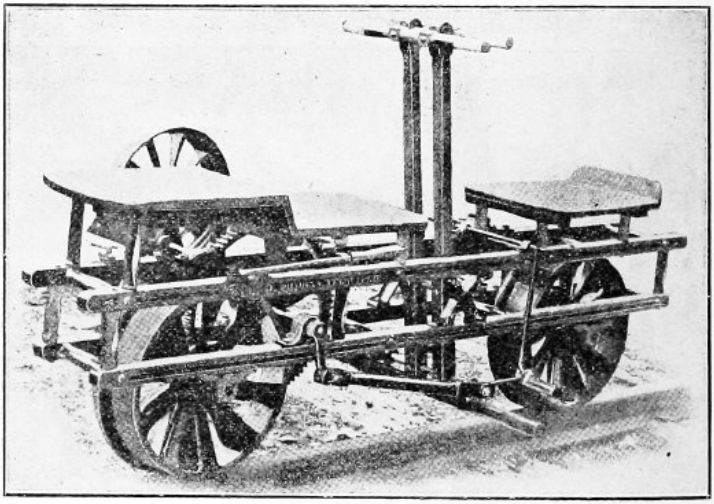
No. 5. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; attachment for carrying surveyor's tools or newspapers; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



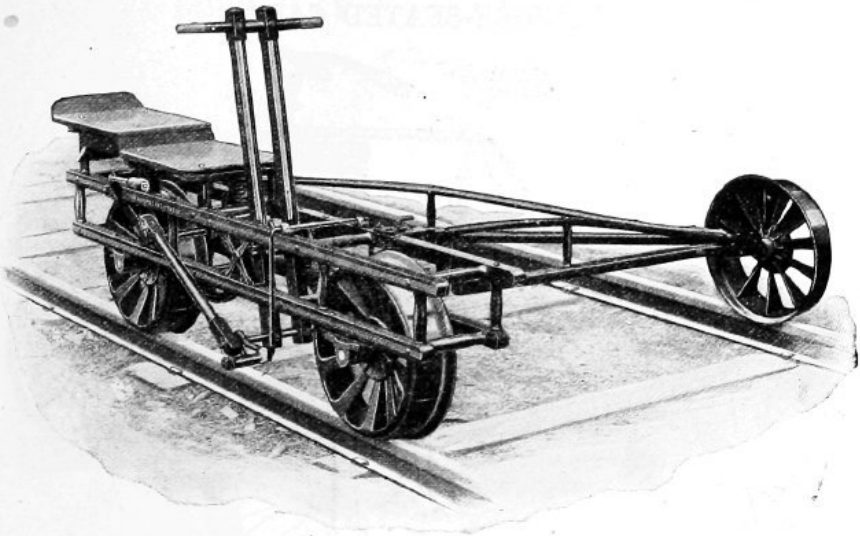
No. 6. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



No. 7. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; same as No. 2, except with wooden seats; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.



No. 8. The Donovan Improved Three-Wheel Velocipede.

Standard gauge; same as No. 1, except with wooden seat; pressed steel wheels, 16 inches in diameter; detachable arms. Furnished to suit any gauge not less than 36 inches. Shipping weight, 150 lbs.

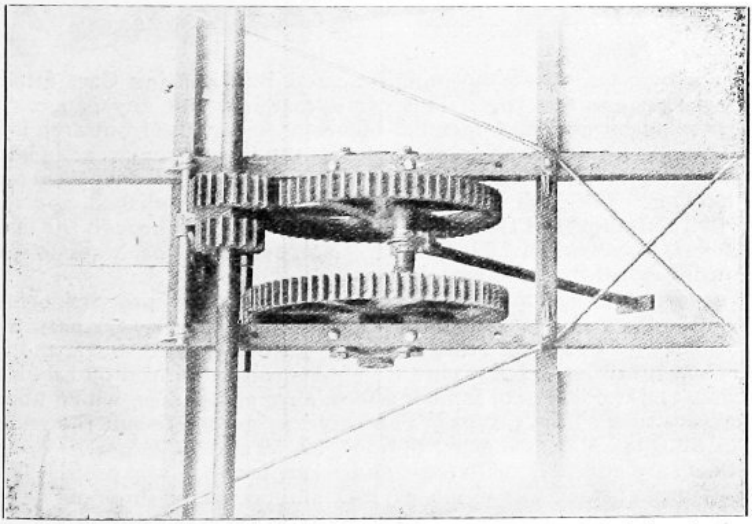
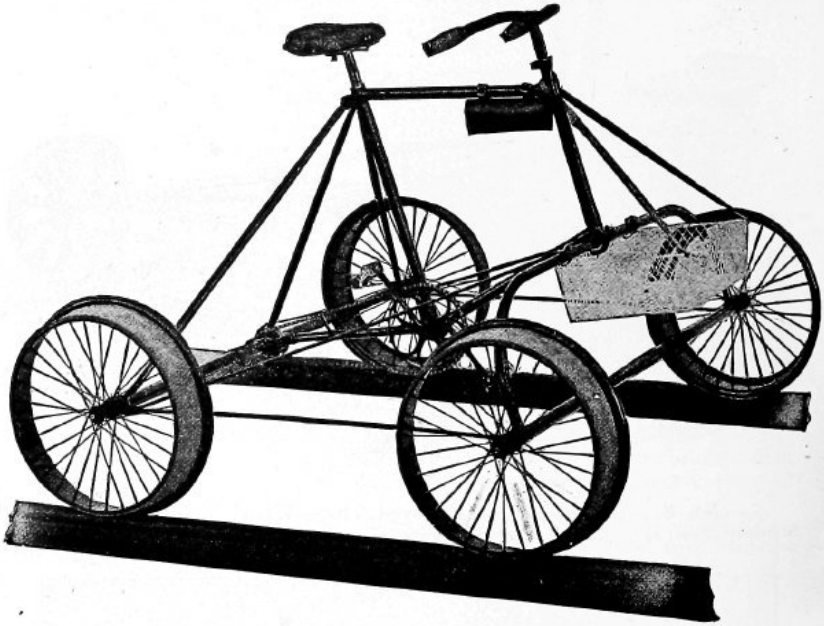


Illustration showing the construction of our **special double gear and slip pinion** below platform. Slow gear for heavy grades. Fast gear for level tracks. Can be attached to any of our hand cars.

SINGLE-SEATED CAR.



The above cut shows our Single-Seated Ball-Bearing Car, fitted with luggage basket and tool bag. This car is made to suit any gauge. When built for standard gauge, 4 feet 8½ inches or wider, the front arch is joined to the diamond frame in such a manner that the former may readily be folded back under the latter, which reduces the car to a more compact form for storing or hauling. The folding is easily and quickly accomplished, and necessitates only the removal of two nuts. The cars will pass through the door of a baggage car, however, without folding. Narrow gauge machines do not fold, as the width is less than the wheel base.

The narrow gauge models of this car are admirably proportioned. The narrower the frame, the stronger and more rigid it is; hence the narrow gauge car is capable of enduring more than the car of standard width, though the latter is amply strong. These cars are extensively employed on rough mountain roads, and the tracks of lumber and mining companies, which abound in steep grades and sharp curves. The cars are geared to suit the grade conditions. 62 is the standard gear; options, 52, 58 and 73.

All cars are equipped with luggage basket, tool bag and tools.

The Single-Seated Car weighs 65 lbs., and crates for shipment at 100 lbs.

List.....$75 00

DOUBLE OR TWO-SEATED CAR.

The above cut shows our Double or Two-Seated Car, which is furnished for any gauge above and including 3 feet. This car can not be built for a road of narrower gauge than 36 inches.

Our double car is the swiftest railway vehicle made, except those propelled by artificial power. It is the ideal inspection car for two riders, as it enables each rider to give his attention exclusively to his side of the track.

The position of the two riders is convenient for conversation, and neither obstructs the view of the other.

This car runs so lightly that one rider can operate it alone with but little more exertion than is required to run the single-seated car.

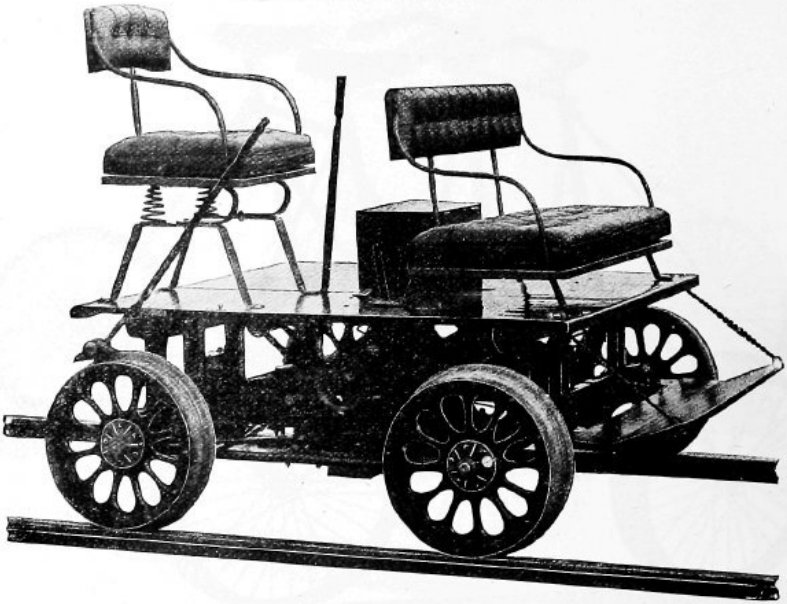
The cars are geared to suit the grade conditions. 62 is the standard gear. Options 52, 58 and 73.

All cars are equipped with luggage basket, tool bag and tools.

The Double-Seated Car weighs 75 lbs., and crates for shipment at 125 lbs.

List price.....$100 00

GASOLINE MOTOR CAR.



Our Motor Cars are regularly equipped with a Standard One-Speed forward gear. This style car is suitable for use on roads having grades not to exceed 1 per cent., and the car, when operated with this gear, will attain a rate of speed of 15 to 25 miles per hour. Where the car is to be used on roads having grades to exceed 1 per cent. and up to 4 per cent., it is necessary to equip the car with a Two-Speed gear, which consists of the Standard gear and Low gear. The Low gear will enable the car to mount grades at a rate of speed of 8 to 10 miles per hour.

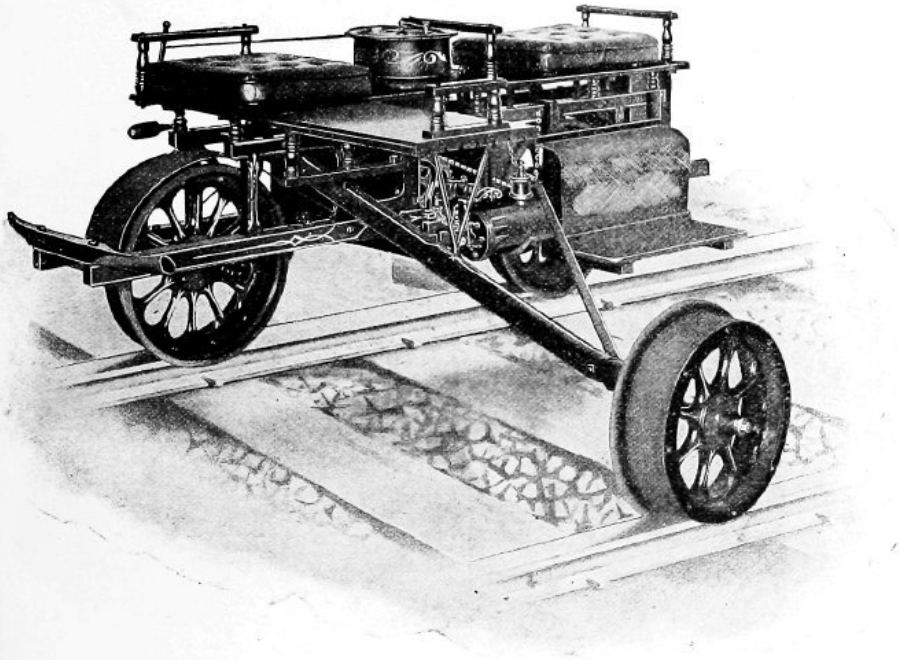
The car can be equipped with a Two-Speed gear; One-Speed forward and reverse or a Two-Speed forward and reverse gear, when desired, and at an additional cost.

The Two-Speed and reverse gears are operated while the motor is in motion.

The standard gauge car (4 feet 8½ inches) weighs 500 lbs.; crated, 700 lbs.

Price, One-Speed	$300 00
" Two-Speed	325 00
" Two-Speed and Reverse	350 00

No. 1 GASOLINE MOTOR CAR.

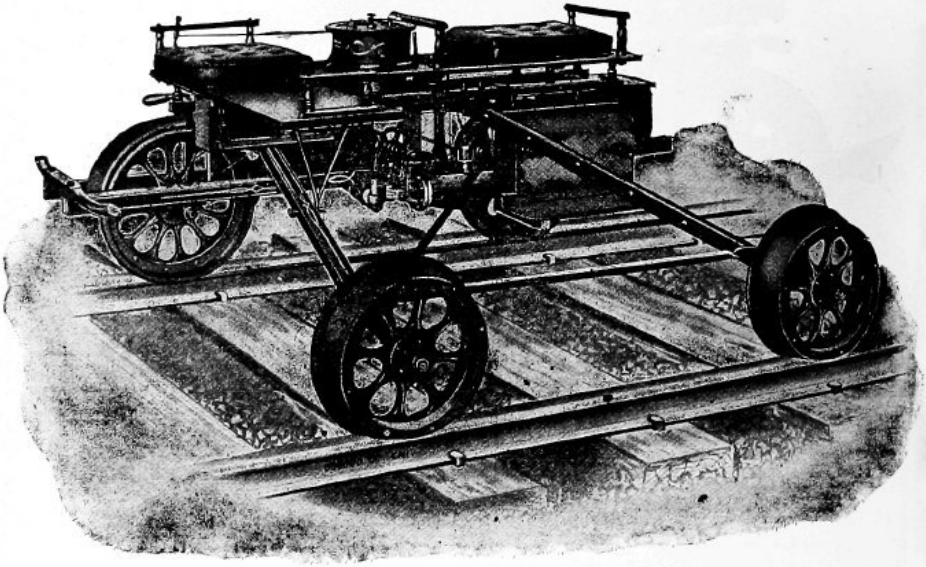


Railway men, particularly chief engineers, engineers maintenance of way, track and bridge inspectors and roadmasters, have long felt the need of a light and cheaply operated motor car, by which they would be enabled to get over the road quickly, and make as frequent stops as necessary to permit of close examination of track, bridges, roadway, structures, etc.

That we have satisfactorily solved this question for our railroad friends is best indicated by the very large demand so quickly developed for our Gasoline Motor Car, illustrated above. It fulfills admirably all the requirements of such a car; that is, it is light in weight, simple, safe, economical to operate, convenient, speedy and reliable. Readily handled by one man.

Price.....$

No. 2 GASOLINE MOTOR CAR.



This car is identical with our No. 1 car, excepting as follows:

Tool box is placed under front seat, also has extra guide arm and wheel for greater stiffness in running.

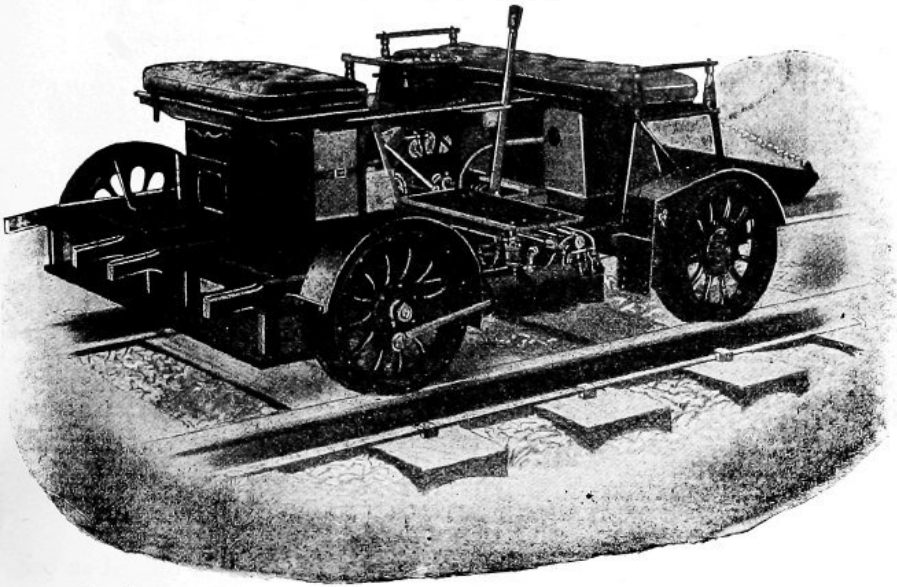
All machinery parts interchangeable with No. 1 car.

Weight, ready for service, 385 lbs.

Price.....$

No. 9 MOTOR CAR.

STANDARD GAUGE.



Cooling tank has capacity of 10 gallons; gravity circulation.

The capacity of the gasoline feeding tank is 2 gallons, or sufficient for a run of about 125 miles.

The gas is ignited by an electric spark produced by use of eight dry cells and resistance coil.

The engines are of the four-cycle type, transmitting motion to rear axle only.

Cylinders are 3¼ inch diameter and 6 inch stroke, and are water-jacketed.

Wheels, wooden center, with steel tire; tread, 3½ inches.

Hubs are fitted to axles with taper fit.

Driving axle is 1½ inch diameter; journal, 1 7/16 inches.

Front axle is 1¼ inch diameter; journal, 1 3/16 inches.

Journal boxes of malleable iron, provided with brass journal bearings.

Brake acts on two wheels and is operated by lever from front or rear seats.

Necessary wrenches and wire cutters, also oil cans, provided in tool box under rear seat.

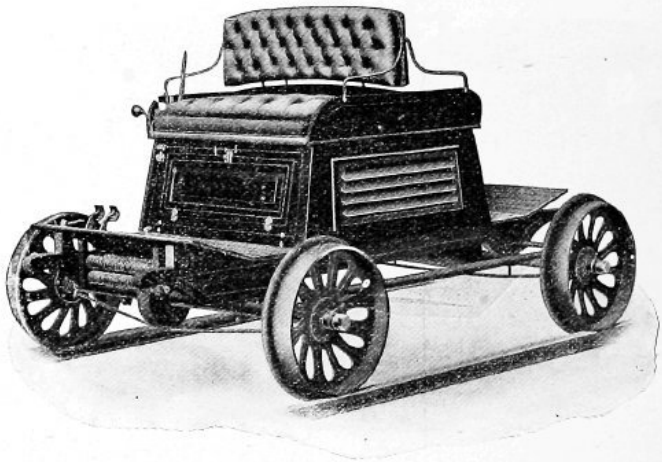
Front and rear seats provided with cushions.

Car is neatly painted with two coats of paint and one coat of varnish.

Car is built to suit gauge of track from 36 inches to 56½ inches, inclusive. For less gauge than 36 inches, we furnish our No. 7 car.

Price.....$

OLDSMOBILE R. R. INSPECTION CAR.



This is an edition de luxe of a power car and is offered as our R. R. Inspection Car. Like all our engines, this car is built to run, AND IT DOES.

MOTOR.

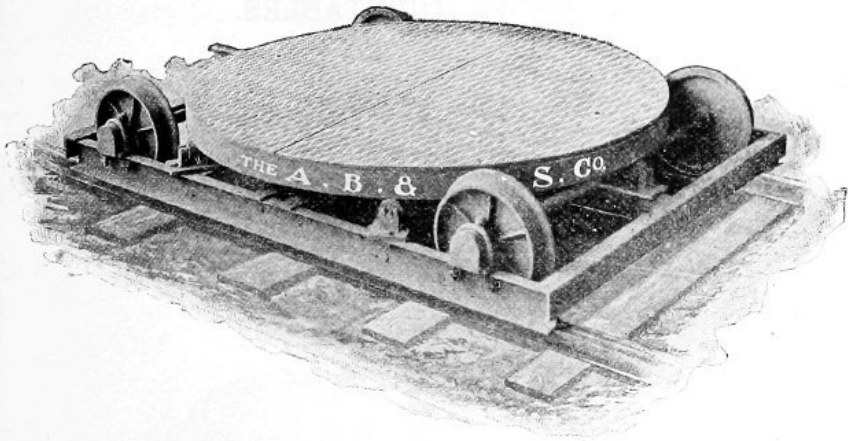
4½ H. P. gasoline Engine, four-cycle type; 4½ inch bore, 6 inch stroke. Mechanically actuated valves, jump spark ignition. One lever for all speeds, forward and backward. Starts at will of operator from the seat. Traveling radius, 75 to 100 miles on one filling of tanks.

FRAME.

Cold drawn Seamless Steel Tubing, reinforced; roller bearings, etc.

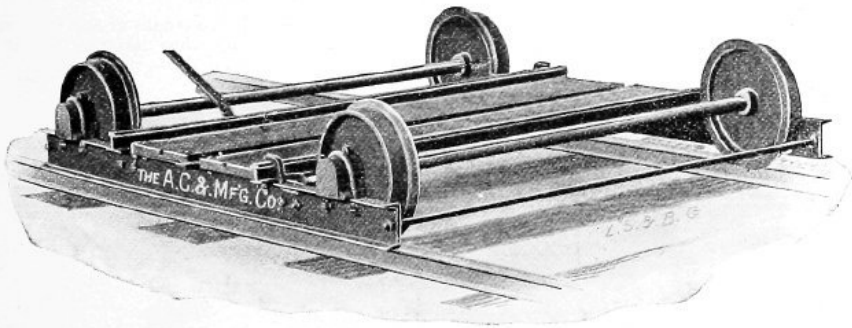
CAR BODY.

Finished dark green and black; full leather upholstered seat and lazy-back.



No. 144. Combination Transfer Car Turntable.

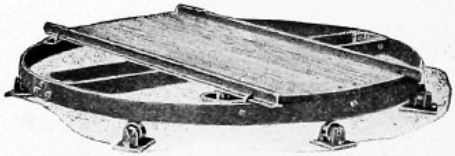
Transfer Car similar to No. 142, except that it is made to suit Turntable. Can also be equipped with Turntables same as No. 146 or No. 146A.



No. 142. Transfer Car.

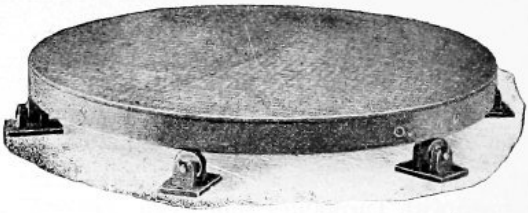
Steel construction. Great strength and light weight combined. Fitted with heavy diagonal braces of wrought iron, absolutely preventing racking. Distance top to top of rails, 6 inches. Length of rails on car, 5 feet. Gauge in to in of Transfer Car rails, 48½ inches. Gauge in to in of rails on Transfer, 24 inches.

FOUNDRY TURNTABLES.



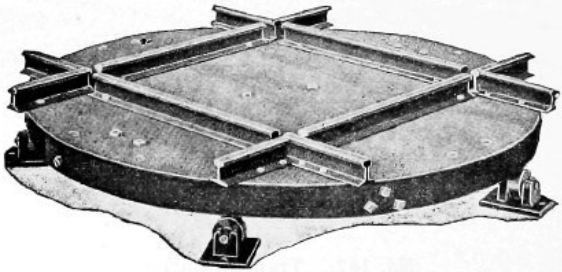
No. 146. Turntable, Rail Top.

A low-priced Wrought Turntable of unusual strength. Diameter of ring, 5 feet. Gauge in to in of rail, 24 inches. Made in all diameters.



No. 147. Checkered Steel Top Turntable.

This cut shows Checkered Top Turntable, always ready to receive cars at any position, running on Turned Rolls. Made in all sizes from 24 inches to 96 inches diameter. Notice how our tables are braced through the center. Will not break or bend.



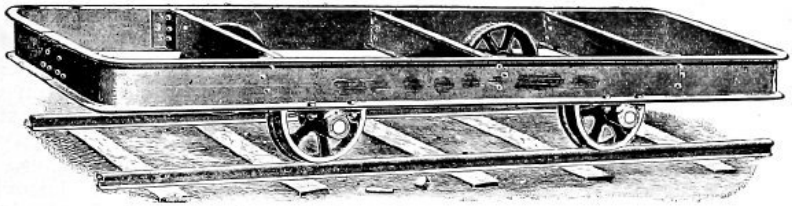
No. 146A. Right Angle Track Turntable.

Similar to No. 147 except that it has plain plate top with rails riveted to same and set at right angles so as to receive cars at four different points. Revolves on turned rolls. Made in sizes from 3 to 7 feet diameter.

Standard Turntable.

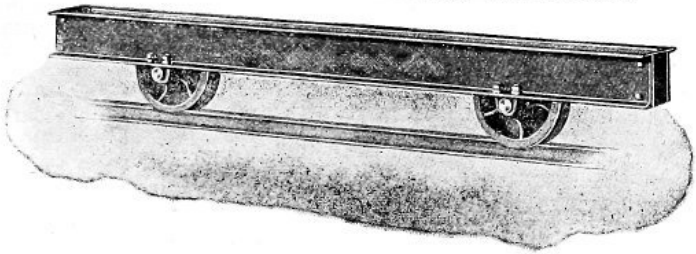
Diameter, 5 feet. Gauge in to in of rails, 24 inches.

ALL STEEL LUMBER DRYER AND TRAMWAY CAR.



Our cars, made of wrought steel, are *stronger, more durable, lighter* and, necessary repairs considered, much *cheaper* than anything made of wood. Our improved Roller Bearings make the *easiest running* car on the market. Made of any desired size or capacity.

ALL STEEL LUMBER DRYER TRUCK.



Does the steam from the lumber soften the wood of your truck frames and put them out of shape?

Ours are guaranteed not to break or bend, warp or sag.

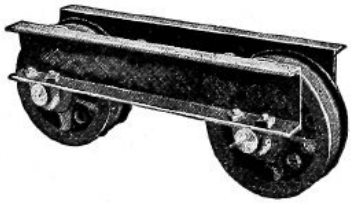
Do you find it necessary to occasionally use a half dozen men to push your trucks?

Ours, being fitted with Roller Bearings, can be handled by a boy.

The strongest, lightest, most durable, easiest running.

6 feet long.....each, $7 50

ENDWAY PILING STEEL TRUCK.



This Truck is constructed entirely of iron and steel, the wheels and spreaders being iron while the sides, axles and roller bearings are of steel. Anti-friction roller bearings are used on this car, which makes it easy running.

22 inches long.....each $6 50

MINING CARS (DUMP CARS), WHEELS AND AXLES.

This department embraces a complete line of Cars, Wheels and Axles for carrying Ores, Phosphates, Lumber, Coal, etc., and if interested in this line it is important that this page should receive your careful attention and study.

It is necessary that very exact and careful specifications be given when ordering mining cars, wheels or axles. Our car wheels are of three styles, all of which are made by the best chemical expert in the United States. The metal is of the same quality that goes into Standard Railroad Wheels. The proportions and weights are those best adapted for hard service. The wheels being stronger, are lighter than the average. The life of the wheels will probably outlast that of the purchaser, as a test will prove, and hence they prove extremely economical in the long run. Like most machinery, it generally pays to buy the BEST at the start. Wheels Style 1 and 2 are shown on page 581. Our special Wheel, Style A-1, is a mining wheel with closed hub, packed with felt, and dust and water proof. Being more expensive, it interests only those who are willing to pay for its superior advantages and economies.

In ordering car trucks the following specifications are necessary:

1. Inside or outside bearings?
2. Wheels loose or tight on axle?
3. Gauge of track (measurement inside heads of rail).
4. Diameter of wheel and style (see cuts).
5. Kind of axles (square or round) and size.

In ordering mining cars the following specifications are necessary:

Specifications 3, 4 and 5 above.

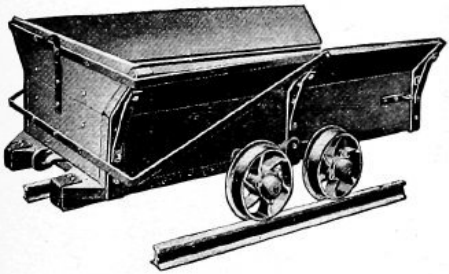
6. Style of car from cuts on following pages.
7. Capacity of car in cubic feet level full (coal weighs about 50 lbs. per cubic foot).
8. Cars iron work or wood work complete?
9. Description of brake if desired.
10. If couplings are desired, state style of coupling and size of links, etc.

The following specifications can be left to us, but if particular as to these specifications, they should be given:

11. Style of draw-bar as shown on one of cars, and size.
12. Style of bumper as shown on one of cars, and size.
13. Width of irons inside top known as "a."
14. Length of car out to out of binders (known as "e").
15. Height of extra vertical plank of car.
16. Width of sloping plank.
17. Weight of extra vertical plank.
18. Sizes of front, center and rear binder belts.
19. Height that car is boarded up in back above bottom planks.
20. Size of hole in draw bar.

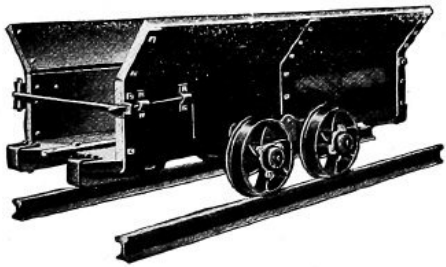
MINING CARS.

STYLE A.



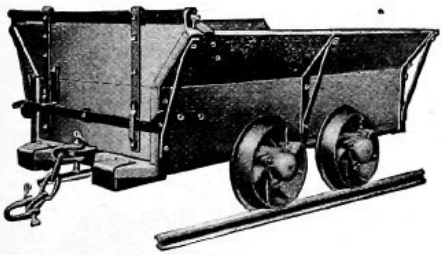
Style A.
Quick-dumping car, center hinge.

STYLE B.



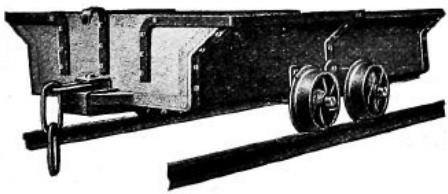
Style B.
Front gate latch for lump coal.

STYLE C.



Style C.
Quick-dumping car. Gate hinges to front binder. Very strong and serviceable.

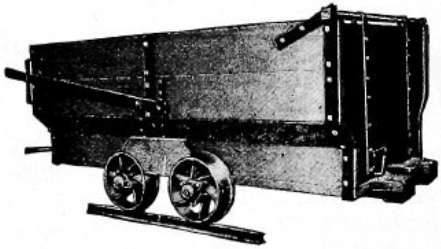
STYLE D.



Style D.
"Blue Gem Car."
A very cheap and economical car for small veins.

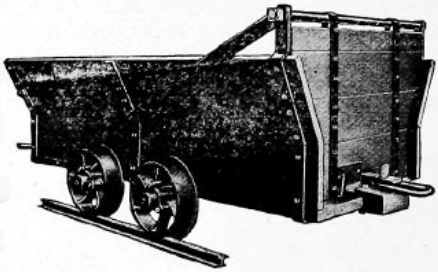
MINING CARS.

STYLE E.



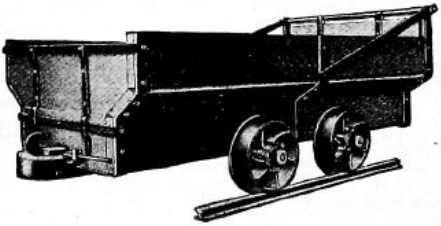
Style E.
A simple, effective brake and convenient release to front gate.

STYLE F.



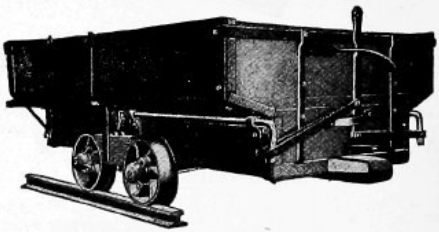
Style F.
Front gate built high for steep inclines. Cast center bumper.

STYLE G.



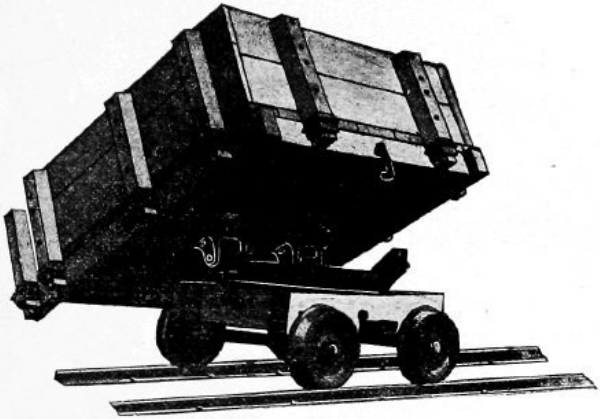
Style G.
This car will carry a great deal of coal economically. The coupling is welded into front end of draw-bar.

STYLE H.



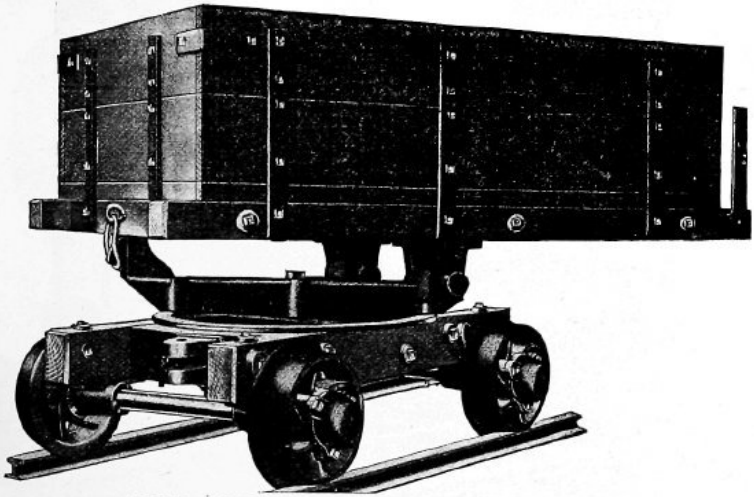
Style H.
This is one of the best double acting brakes ever applied to a mining car. The car shows up for itself. Used in large veins.

DUMP CARS.



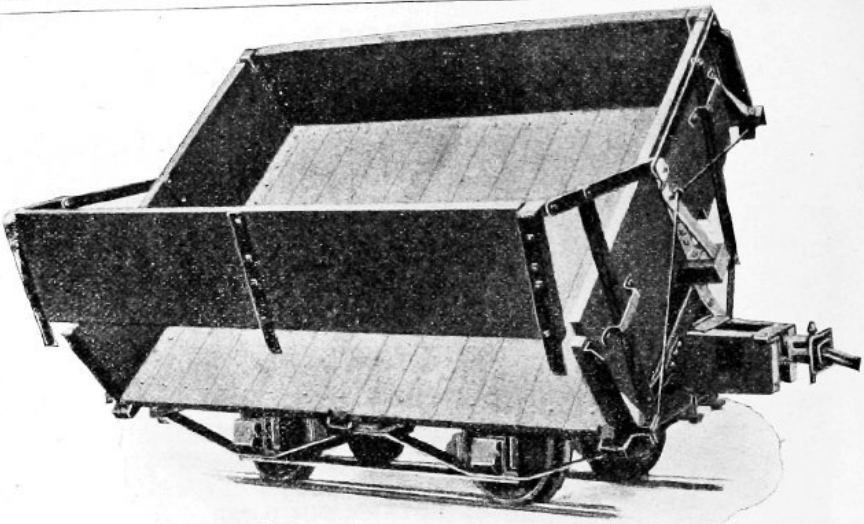
HEAVY UNIVERSAL ROTARY DUMP-CAR.

This is a very heavy, serviceable contractors' Dump Car, built to stand the roughest usage. Heavy wheels and axles and babbitted boxes. Can be taken to pieces for shipment in ten minutes. Any capacity or gauge.

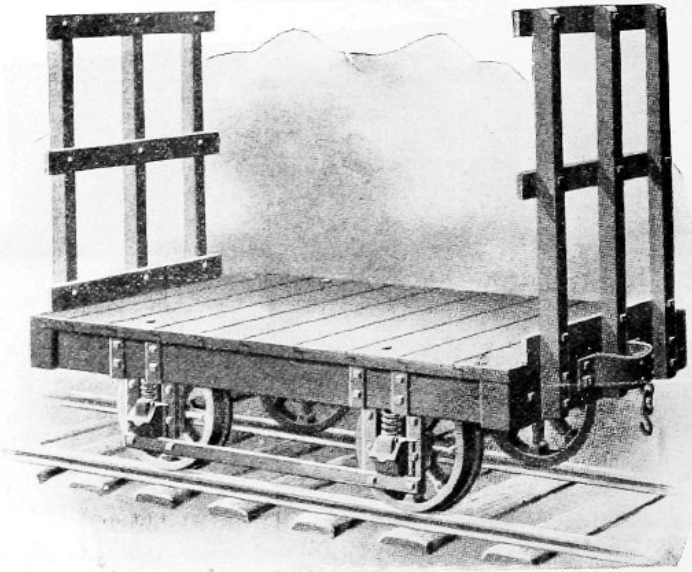


LIGHT UNIVERSAL ROTARY DUMP-CAR.

A very nice light car with self-oiling wheels and cast boxes. Dumps in any direction. Invaluable for lighter work, for hauling ores, slate from mines, etc.

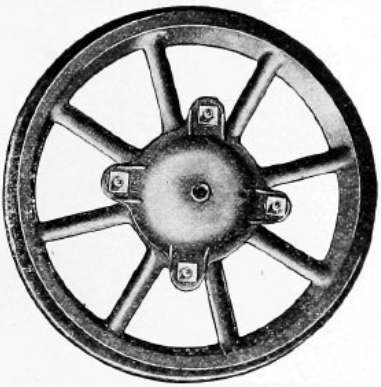


DUMPS. Three-fourths to six yard, Rotary, One or Two-way, Pedestal or Arch-bar Type, with or without Brakes.



CANE OR PLANTATION CARS. Any length, gauge or capacity; Single or Double Truck.

WHEELS AND AXLES.

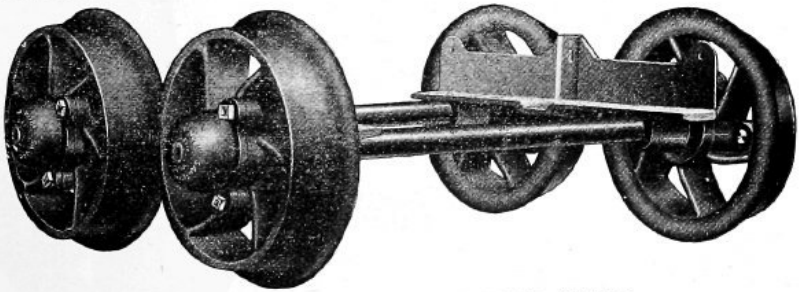


SELF-OILING WHEEL.
Style I.

Cap cannot work loose. A very efficient wheel. Made of very best grade chilled charcoal iron.

SELF-OILING WHEEL.
Style II.

A very simple, economical, and strong wheel. Diameter 8 to 18 inches.



STANDARD TRUCK FOR ROUND AXLES.

SINGLE CAST BOXING FOR ROUND AXLES.

Square axles also furnished with proper lugs, collars, etc. Axles machinery steel with thorough machine work. When ordering give specifications 3, 4 and 5, page 576.

WHEELS AND AXLES.

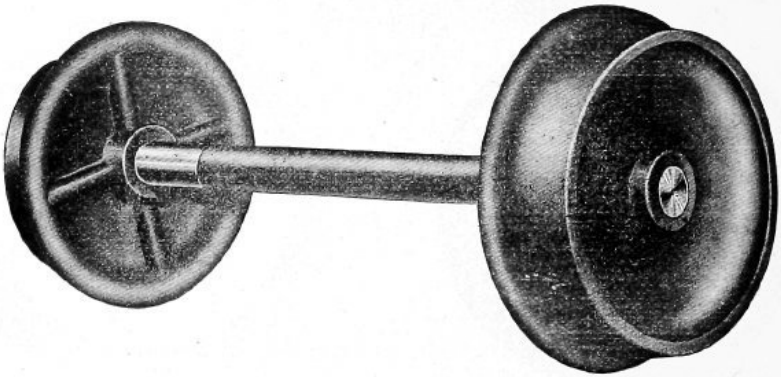
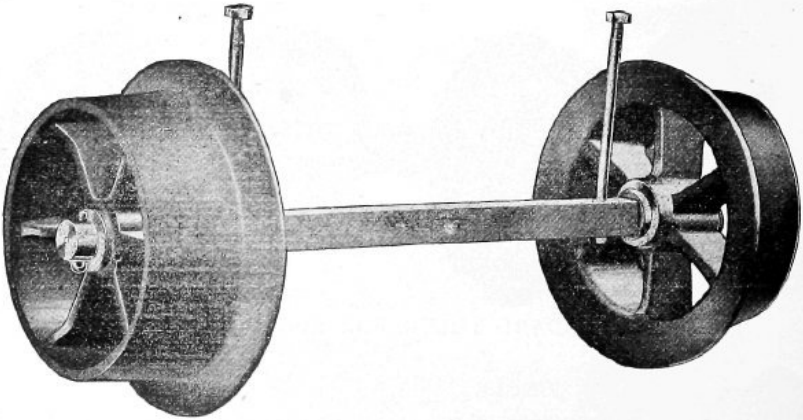


PLATE WHEELS PRESSED ON AXLES.

These wheels are equal in quality to our spoked wheels; that is, they are the best that can be had. In ordering give specifications 1, 2, 3 and 4, page 576.

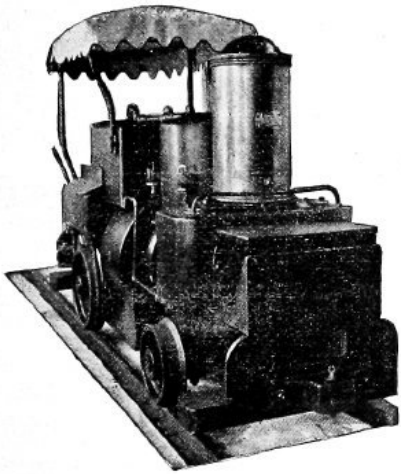


LUMBER TRUCK WHEELS.

Wheels for wooden rails. Gray iron, strong, but not unnecessarily heavy. Axles square or round. In ordering give specifications 1, 2, 3, 4 and 5, page 576.

Freight and logging car wheels and axles furnished on any specifications; also oil boxes and brasses.

PROUTY GASOLINE MINE, TRAMWAY AND INDUSTRIAL LOCOMOTIVES.



When Prouty introduced the **Mechanical Feed** into the gasoline engine and discovered the now famous **Reversible, Flexible Clutch,** the successful gasoline locomotive was assured. But it has taken time to work out and test the best construction and proportions of all the parts to make the locomotive simple, practical and durable, all of which has been so perfectly done that the **Mechanical Feed** Prouty Gasoline Locomotive stands in a class of its own.

In these Locomotives the engine runs continuously one way and the power is transmitted to the axle by means of the **reversible, flexible clutch.**

The Locomotive is easily graduated to any speed to make couplings, crossings, curves, etc., and may be reversed instantly if occasion requires without damaging any of the working parts.

In writing for quotations, give gauge of track, weight of rail per yard, grades, curves, length of haul, weight of cars and total tonnage to be taken out in a day's run.

LOCOMOTIVES, CARS AND OTHER RAILROAD EQUIPMENT.

Our facilities for furnishing New and Second-hand and Rebuilt Engines are unsurpassed. We are the general Western agents for the Vulcan Locomotive Works, and can furnish for prompt delivery engines of any type, weight or gauge, thoroughly first-class throughout.

We always have on hand a large number of good, serviceable Second-hand Engines in good repair, for immediate delivery, and endeavor to keep as many different types, gauges and weights as possible.

We make a specialty of various types of Geared Engines for logging roads with steep grades, also have Forney types and other locomotives with short wheel base for use on roads that have very sharp curves.

Our numerous force of salesmen and our several branch houses are constantly on the lookout all over the United States for thoroughly first-class second-hand equipment, which we buy for spot cash; this enables us to sell at bottom prices, either for cash or on time.

We can also furnish New and Second-hand Passenger Coaches, Street Cars, Box, Flat, Stock, Logging, One or Two-Way Dump, Cane, Plantation and Industrial Railway Cars, also other equipment of this character.

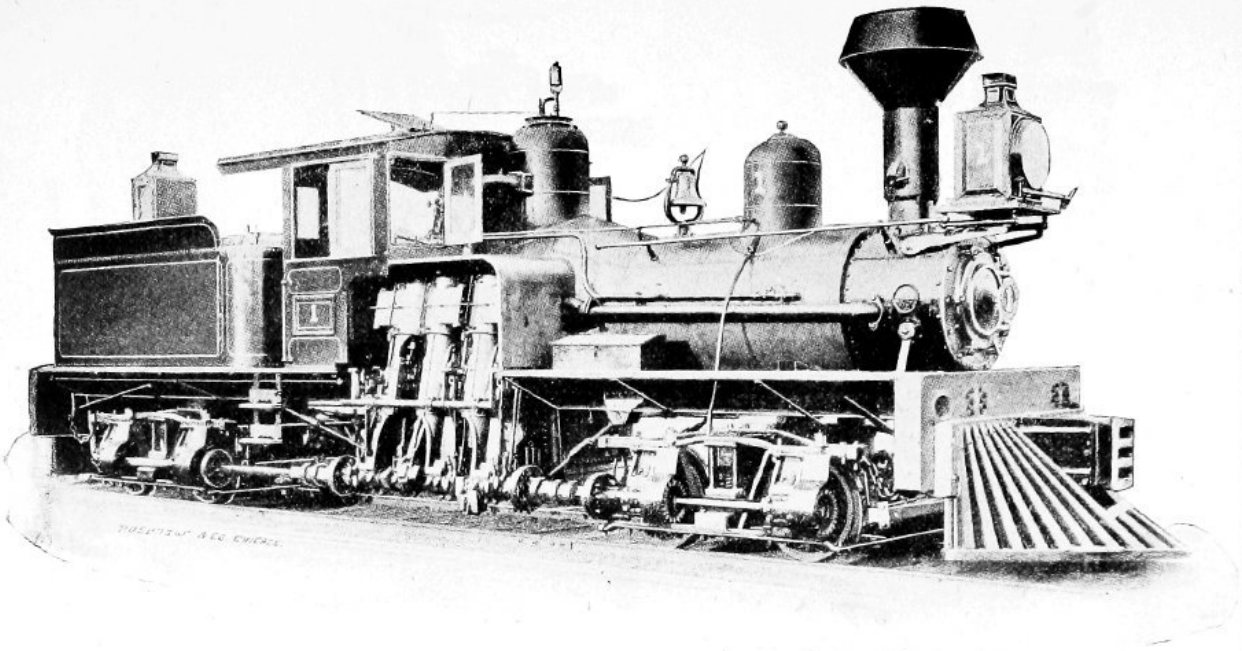
We have a large shop and yard at East St. Louis, where equipment of this kind can be inspected, and we solicit your inquiries and specifications. If we do not have what you want in stock, we can build it in a very short time. It will pay you to correspond with us, as we may have what you want on hand for immediate delivery at prices that will save you money.

We will at all times be pleased to send specifications, photographs or any other information that may be desired.

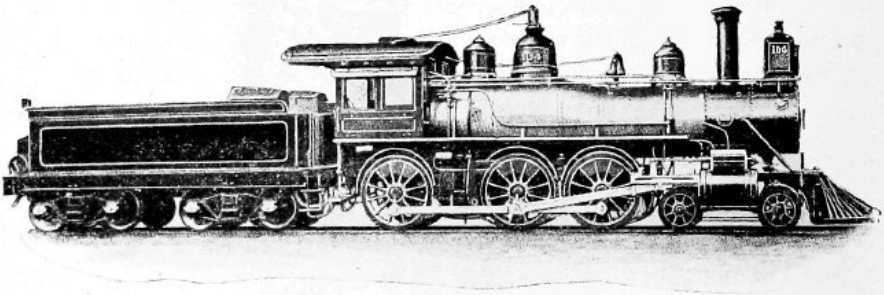
We make a specialty of furnishing Car-Wheels, Axles, Brasses, Castings, Forgings, and all kinds of Locomotive Parts, including Tires, Flues, Springs, etc.

New and Second-hand Bridges, Turntables, Locomotive Cranes, Log Loaders and Skidders can be furnished promptly.

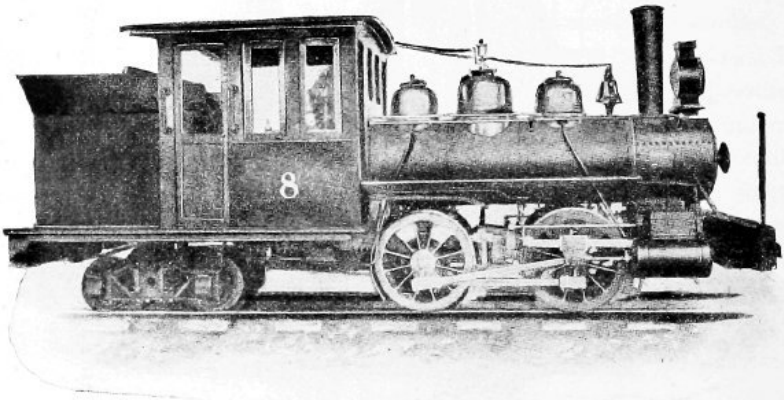
Can also furnish complete contractors' outfits, including Steam Shovels, Dinky Engines, Dump Wagons, Dump Carts, Wheel Scrapers, Slips, Rail and all Hand Tools.



We can furnish any class or style of Geared Engines; gauge or weight as desired.

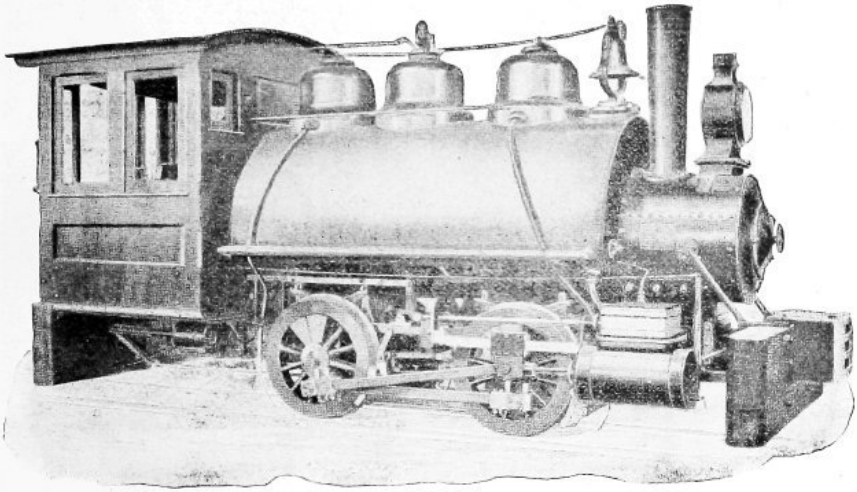


STANDARD TEN WHEELER FOR RAILROADS.

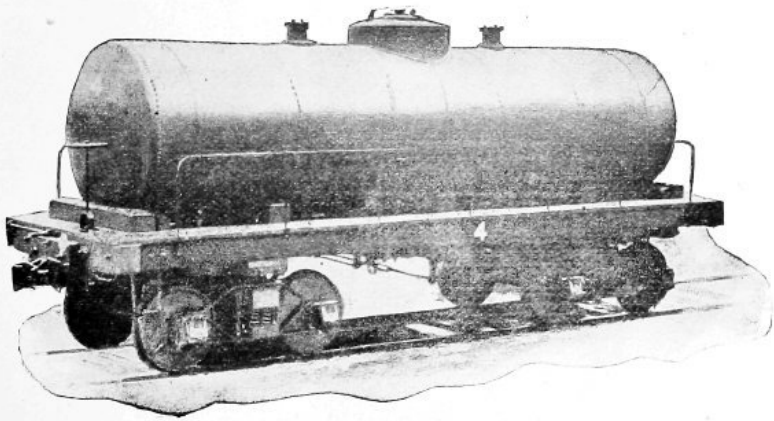


FORNEY TYPE.

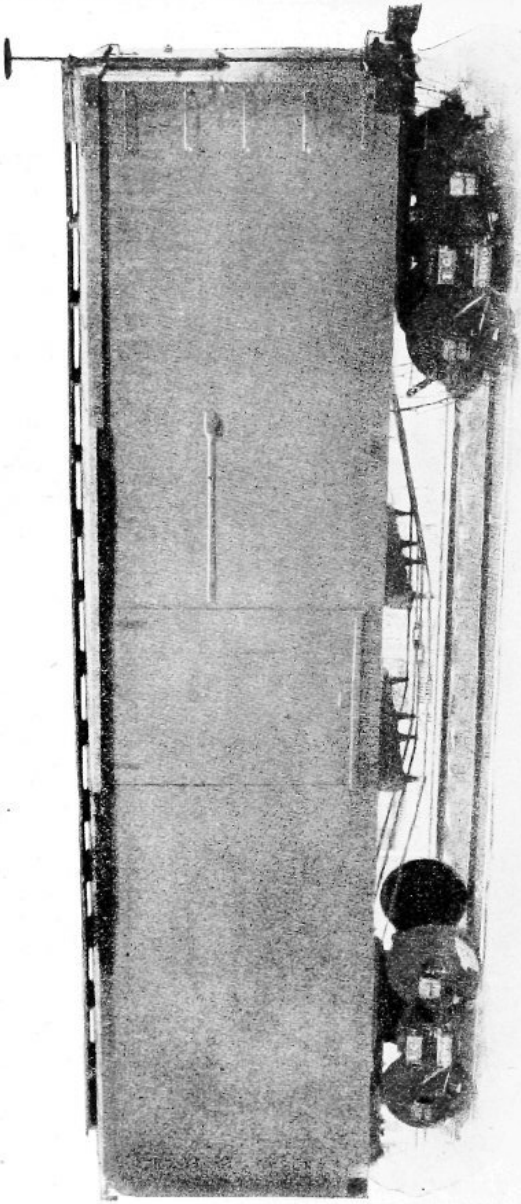
Four Wheel, Rear Swing Truck and Rear Tank, for Logging Roads and Plantations.



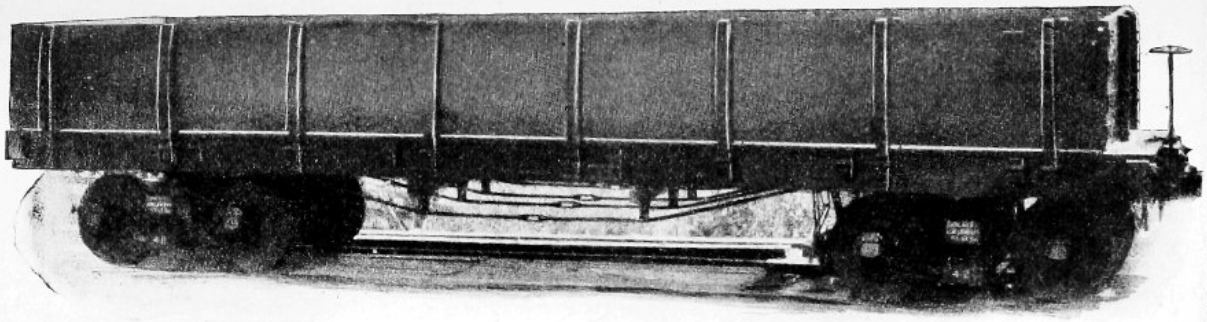
FOUR-WHEEL SADDLE TANK.
For Contractors or Small Logging and Industrial Roads.



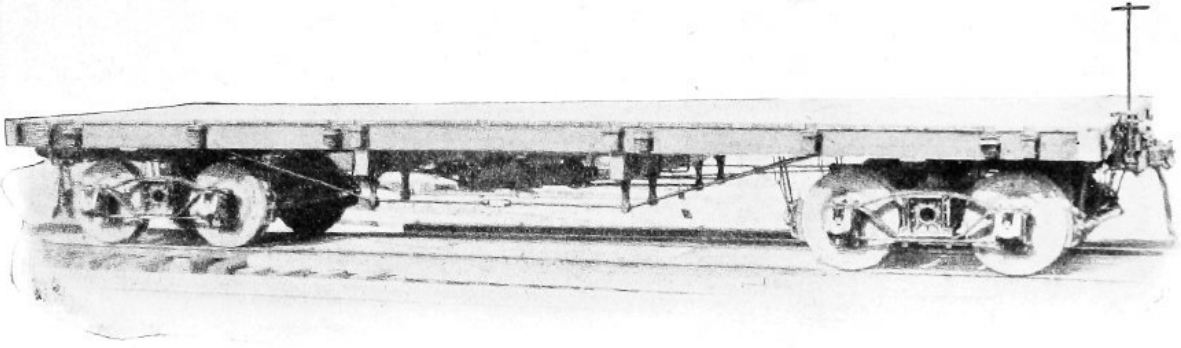
TANK CARS. Hauling Water, Oil, etc.



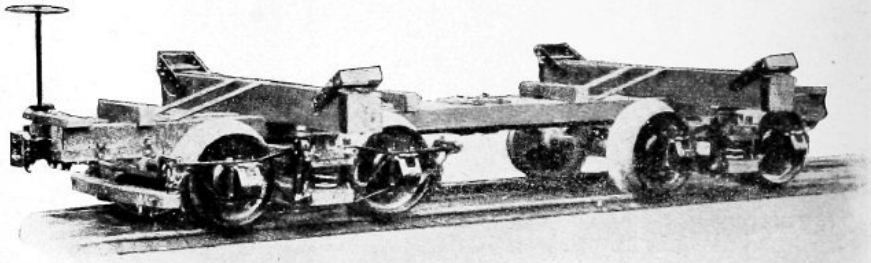
BOX CARS. For Merchandise, Grain, Etc.



GONDOLA CARS. Flat or Hopper Bottom, any capacity desired.

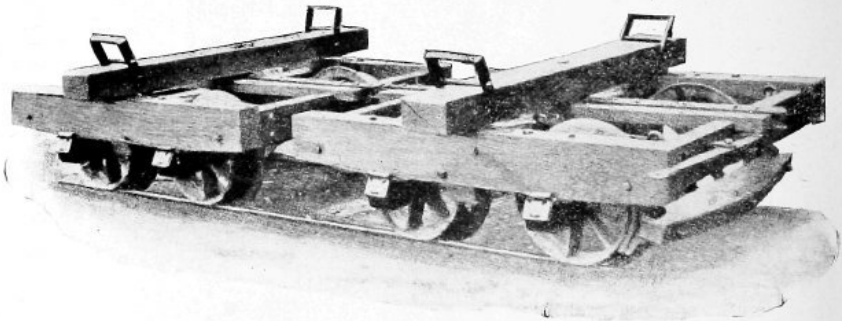


FLAT CARS. Any length or capacity, with or without Air Brake or Automatic Couplers.



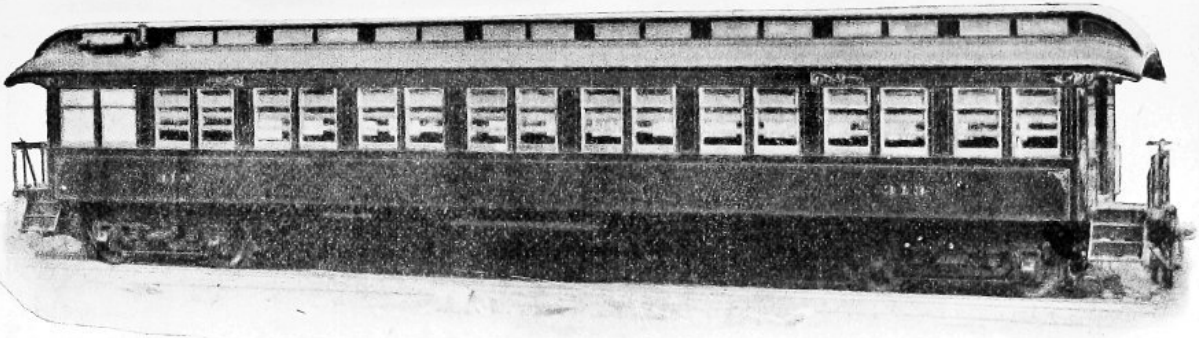
LOG CARS.

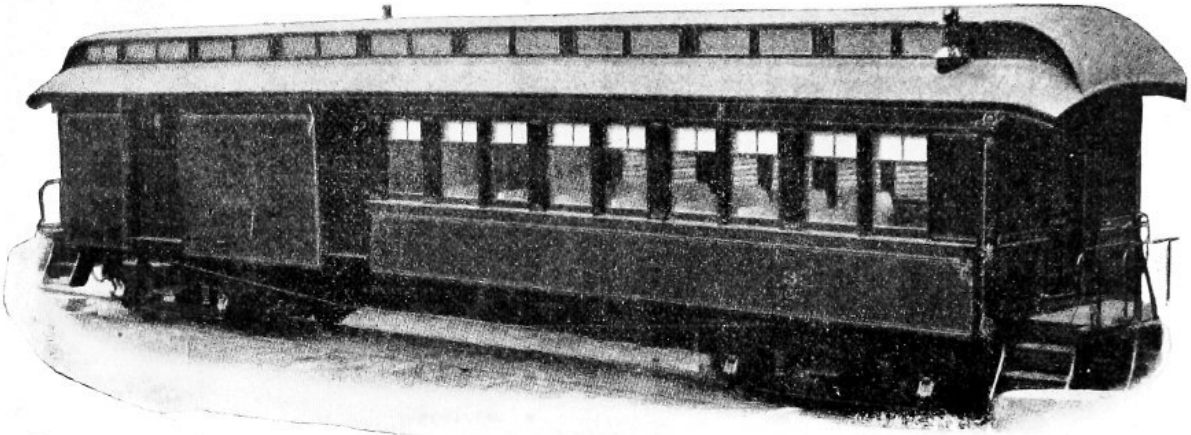
Set up complete or knocked down; any gauge, capacity or style.



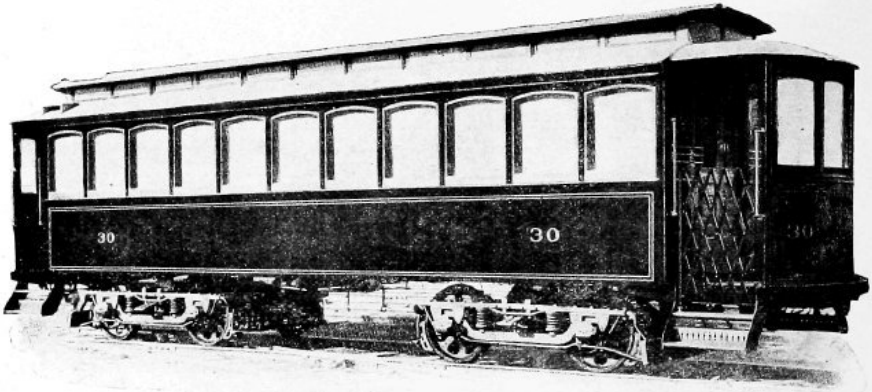
LOG TRUCKS.

Furnished as desired.



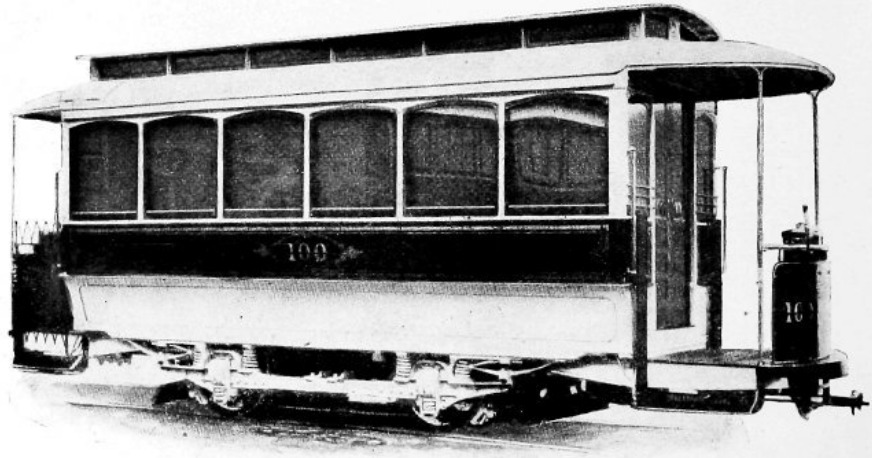


COACHES AND COMBINATION CARS.



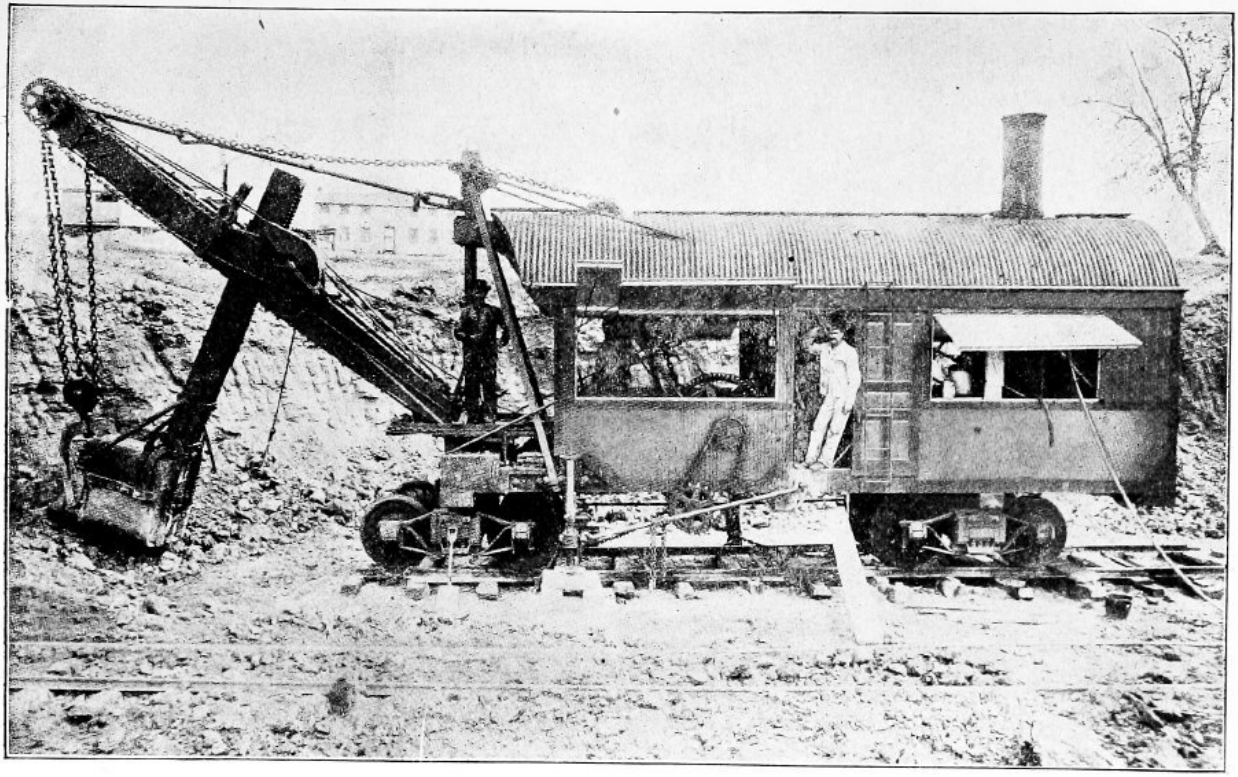
INTERURBAN CARS.

Transverse Seats, Double Trucks, Double Motors, with or without Vestibule.



STREET CARS.

Longitudinal or Transverse Seats, Single or Double Trucks, and Motors as desired.

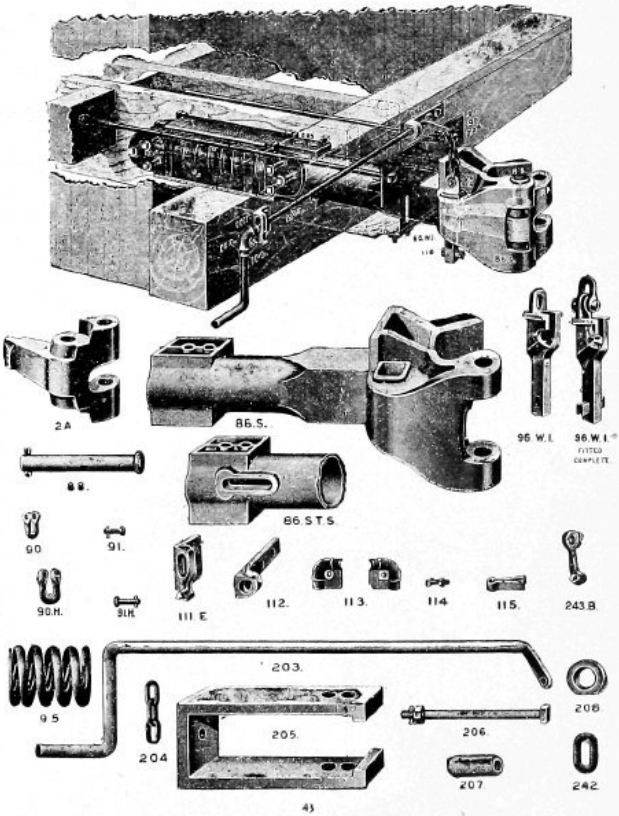


STEAM SHOVELS OR DREDGES.

Any size or style of Dipper on Standard Railroad Trucks, Traction Wheels or Barges
First-class Second-hand Machines always on hand.

JANNEY COUPLER FOR FREIGHT CARS.

8.—APPLICATION WITH SPRING POCKET.



JANNEY COUPLER FOR FREIGHT CARS.

B.—APPLICATION WITH SPRING POCKET.

LIST OF DETAILS COMPRISING ONE-HALF SET.

NAME.	NO.	NAME.	NO.
Knuckle, wrought	2A	Locking Pin	96WI
Coupler Casting	86S	Uncoupling Lever Lock	111E
Knuckle Pin	88	Uncoupling Lever Keeper	112
Clevis	90	Angle Clip, top and bottom	113
Clevis	90H	Angle Clip Bolt	114
Clevis Pin	91	Split Key	115
Clevis Pin	91H	Trigger, for Locking Pin 96WI	243B

This style of coupler (No. 86S) may also be applied with a draft bolt by using Draft Bolt Washer No. 208.

We can also furnish for application with spring pocket, when desired, Coupler Casting No. 86STS, the rear portion of which is also shown on the opposite page. This style of coupler can be applied with a draft bolt by using Draft Bolt Washer No. 208, and it is also slotted for application with American continuous draft, as shown on page 44.

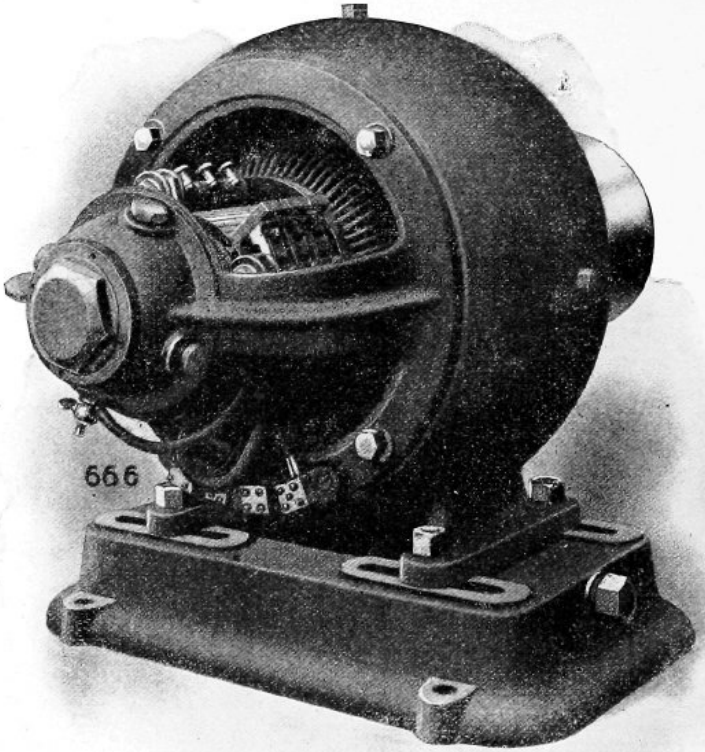
In ordering freight couplers in sets it is not necessary to specify on the order all of the details shown above. The order should read for the number of sets of freight couplers desired, fitted complete, the No. indicating the style of coupler casting required being specified. The proper style of coupler, with the complete list of details above named, will then be shipped in regular course.

LIST OF DETAILS FURNISHED ON SPECIAL ORDER ONLY.

NAME.	NO.	NAME.	NO.
Draft Spring	95	Draft Spring Bolt	206
Uncoupling Lever	203	Draft Spring Ferrule	207
Uncoupling Lever Chain	204	Draft Bolt Washer	208
Spring Pocket	205	Uncoupling Lever Link	242

These details, with the exception of Draft Spring Ferrule No. 207 and Draft Bolt Washer No. 208, are made only on special order and to suit the requirements of each individual case. They are not, therefore, kept in stock, but will be made to order when desired. Orders for them should be accompanied by sketches or blue prints showing dimensions of parts wanted.

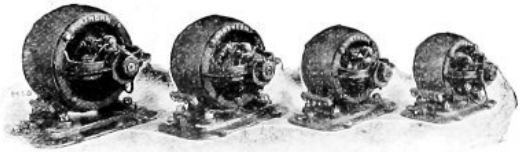
NORTHERN DIRECT CURRENT DYNAMOS AND MOTORS.



The type of direct current apparatus supplied in the Northern is of a character especially adapted to operation in plants where the services of a skilled engineer are not available. The machines are simple, operate economically, are convenient of access, hardy, trustworthy, and superior in every way.

The type of construction is typical of the greatest advance made in electric work at the present time, and includes such features as form Wound Armatures, Self-oiling Bearings, superior Commutators, simple Brush Rigging, and special adaptability to any required service. Where constructed for belt drive the motors are supplied with bases or rails, depending on the size of the machine. The bases are sturdy, and are capable of supporting the machines when operated on the wall or ceiling. The larger types are intended for operation on the floor, and suitable slide rails are provided to take up slack. Where it is desired to direct connect Northern apparatus to the engine or to the machinery driven, the base is omitted and the dynamo or motor bolted direct to the engine sub-base or to a part of the machine prepared to receive it.

The illustration herewith shows the general appearance of Northern Motors of various types.



NORTHERN MULTIPOLAR MOTORS.

SLOW SPEED.					MEDIUM SPEED.					
H. P.	Approx. Speeds.		Pulley.		H. P.	Approx. Speeds.		Pulley.		Price.
	110 and 220 Volts.	500 Volts.	Dia.	Face.		110 and 220 Volts.	500 Volts.	Dia.	Face.	
3	1,150	1,300	6	4	5	1,750	1,950	5	4	$ 276 00
5	950	1,100	7	4	7½	1,450	1,650	6	4½	316 00
7½	825	950	8	5	10	1,300	1,400	7	5	394 00
10	750	850	9	6	15	1,200	1,300	8	7	520 00
15	725	825	10	8	20	1,200	1,300	9	7	590 00
20	650	700	11	9	25	1,000	1,100	10	10	749 00
					30	1,000	1,100	10	10	770 00
25	650	700	12	10	35	950	1,000	12	12	870 00
30	575	625	14	11	40	900	950	14	12	1,080 00
40	575	625	14	12	50	825	900	16	12	1 250 00
50	550	625	18	14	60	825	900	16	14	1,300 00

Prices include automatic no voltage release starters, sliding bases or rails for belt tightener and standard pulleys.

NORTHERN MULTIPOLAR BELTED DYNAMOS.

SLOW SPEED.					MEDIUM SPEED.					
K. W.	Approx. Speed.	No. of 60 Watt Lamps.	Pulley.		K. W.	Approx. Speed.	No. of 60 Watt Lamps.	Pulley.		Price.
			Dia.	Face.				Dia.	Face.	
3	1,250	50	6	4	4½	1,700	75	5	4	$ 280 00
4	1,050	67	7	4	6	1,600	100	6	4½	316 00
5	875	84	8	5	7½	1,300	125	7	5	386 00
7½	950	125	8	6						430 00
7½	800	125	9	6½	10	1,300	167	8	7	520 00
10	800	167	10	8	15	1,300	250	9	8	590 00
15	750	250	11	9	22½	1,050	375	10	10	810 00
20	750	334	13	10	25	1,000	416	12	12	850 00
					30	1,000	500	12	12	870 00
25	650	417	14	12	35	975	583	12	12	1,080 00
30	650	500	16	12	40	975	667	14	12	1,140 00
35	650	583	16	14	45	850	750	16	14	1,260 00
40	650	667	18	14	50	825	830	16	15	1,300 00
50	600	833	20	16	60	750	1,000	18	17	1,600 00

Price includes sliding bases or rails for belt tightener field, rheostats and standard pulleys.

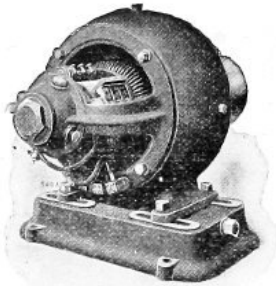
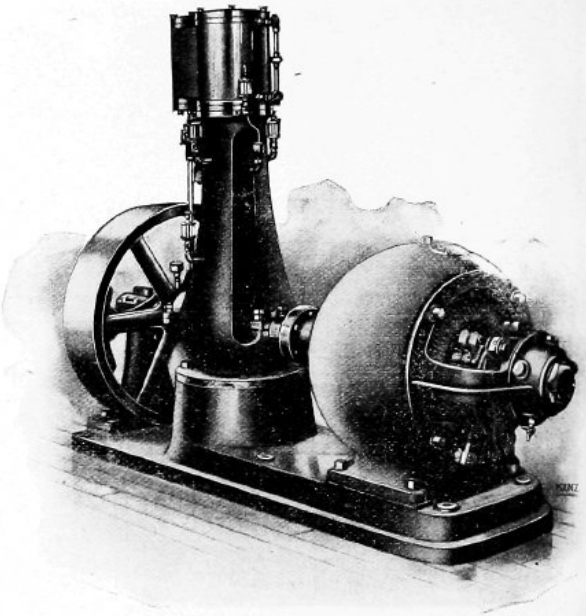


Fig. 8. NORTHERN BELTED GENERATOR (Spherical Type).

Prices on motors are for machines with sliding bases, pulleys and automatic starters.

Prices on dynamos are for machines with sliding bases, pulleys and wall type field rheostats.

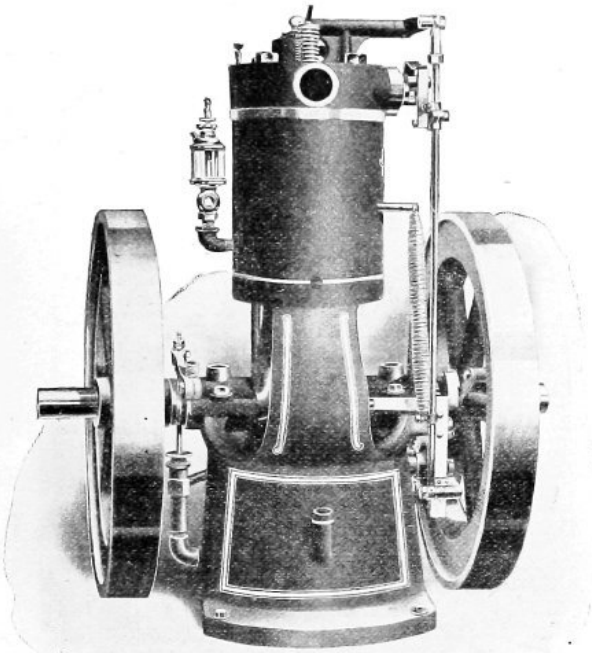


NORTHERN SPHERICAL GENERATOR.
Direct connected to vertical engine.

NORTHERN SMALL MULTIPOLAR MOTORS AND DYNAMOS.

MOTORS.						DYNAMOS.			
Frame.	H. P.	App. Speeds.		Price.		K. W.	App. Speed 110 and 220 Volts.	No. of 50 Watt Lamps.	Price.
		110 and 220 V.	500 Volts.	110 and 220 V.	500 Volts.				
BA	⅛	900	1,000	$ 60 00	$ 66 00	1/10	1,000	2	$ 66 00
BA	¼	1,800	2,000	60 00	66 00	⅛	2,000	4	66 00
BA	½	2,000	2,200	70 00	78 00	¼	2,200	8	66 00
BB	⅛	400	450	80 00	88 00	1/10	450	2	88 00
BB	¼	800	900	80 00	88 00	⅛	900	4	88 00
BB	½	1,600	1,800	84 00	92 00	¼	1,800	8	90 00
BB	⅝	2,400	2,600	84 00	96 00	⅜	2,600	12	90 00
BC	⅛	200	250	110 00	120 00	1/10	225	2	112 00
BC	¼	400	450	110 00	120 00	⅛	450	4	116 00
BC	½	700	800	110 00	120 00	¼	800	8	116 00
BC	¾	1,200	1,400	110 00	120 00	⅜	1,350	12	116 00
BC	1	1,400	1,600	114 00	130 00	¾	1,550	15	120 00
BC	1½	1,600	1,800	126 00	138 00	1¼	1,800	25	120 00
BD	¼	200	250	140 00	150 00	⅛	225	4	160 00
BD	½	300	350	140 00	150 00	¼	350	8	160 00
BD	¾	500	600	144 00	152 00	⅜	550	12	160 00
BD	1	600	700	144 00	152 00	¾	650	15	160 00
BD	1½	1,000	1,150	146 00	152 00	1¼	1,100	25	160 00
BD	2	1,200	1,400	150 00	160 00	1½	1,350	30	160 00
BD	2½	1,500	1,700	156 00	164 00	2	1,600	40	170 00
BD	3	1,800	2,000	160 00	174 00	3	2,000	60	180 00

GASOLINE ENGINES.



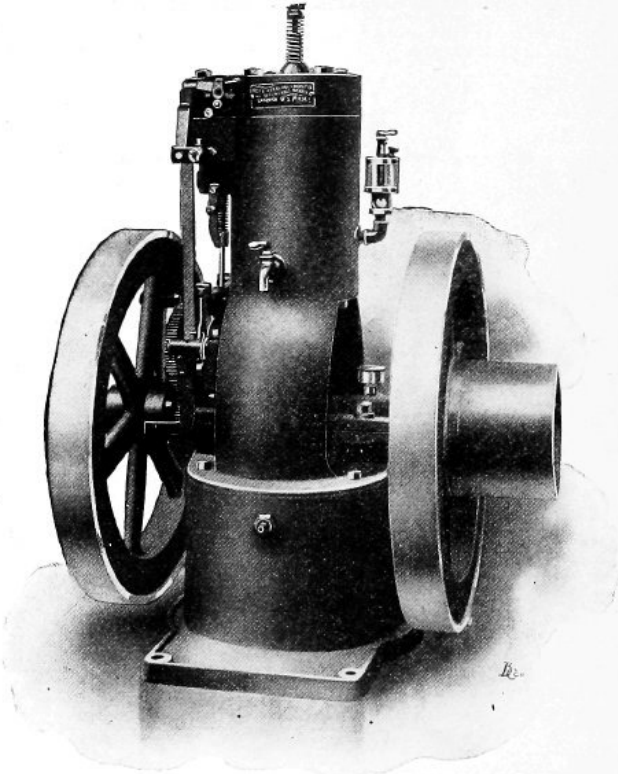
This cut is a correct representation of our 1½ and 2½ H. P. Engine, which is built in the upright style. It is especially adapted for running light machinery.

On these three sizes the gasoline is stored in the base, so that there are very few connections to make. All that is necessary is to set the engine in place, connect cooling tank with hose and nipples furnished, run the exhaust outdoors and your power is ready. We use the electric igniter, so the engine is always ready for use at a moment's notice.

H. P.	Height.	Floor Space.	Pulley.	Revolutions.	Weight.	Diameter of Wheel.	Price.
1½	24 in.	16x20	6x3	400	350	20 in.	$
2½	30 "	18x24	6x3	400	500	20 "	

With each engine we furnish batteries, muffler, hose and nipples for connection to cooling tank, lag screws for bolting down engine, oil can and wrench.

4 H. P. VERTICAL GAS OR GASOLINE ENGINE.



This cut shows our 4 H. P. Engine, which is fitted for gas or gasoline and is especially adapted for running light machinery of any kind, and for farm use, such as pumping, cutting wood, grinding, cutting feed, etc.

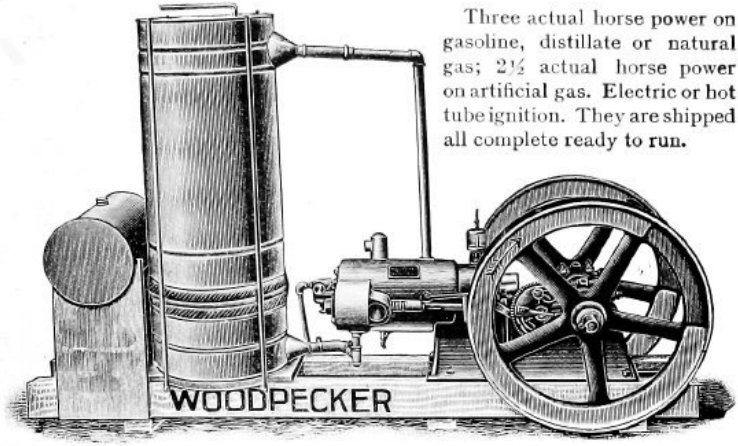
On this style engine there are very few connections to make. All that is necessary is to set the engine in place, connect with cooling tank or water works, run the exhaust outdoors, set up your batteries, and you are ready to run.

The engine is compact. The base is cast hollow, thus making a perfectly safe receptacle for a supply of gasoline, sufficient to run the engine from one to two days. Gasoline is supplied to the generator direct from base without the aid of pump or mechanism liable to get out of order.

These engines are first-class, well-built machines, warranted to develop their H. P. and more, too.

H. P.	Diameter Pulley.	Revolutions.	Weight.	Price.
4	8x6	300	800	$175 00

WOODPECKER ENGINE.

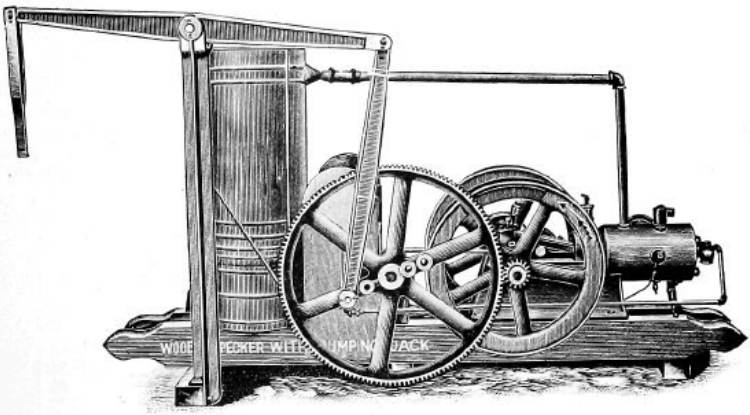


Three actual horse power on gasoline, distillate or natural gas; 2½ actual horse power on artificial gas. Electric or hot tube ignition. They are shipped all complete ready to run.

Weighs 650 lbs.; occupies a space 72 inches long, 28 inches wide, 48 inches high.
Price $160 00

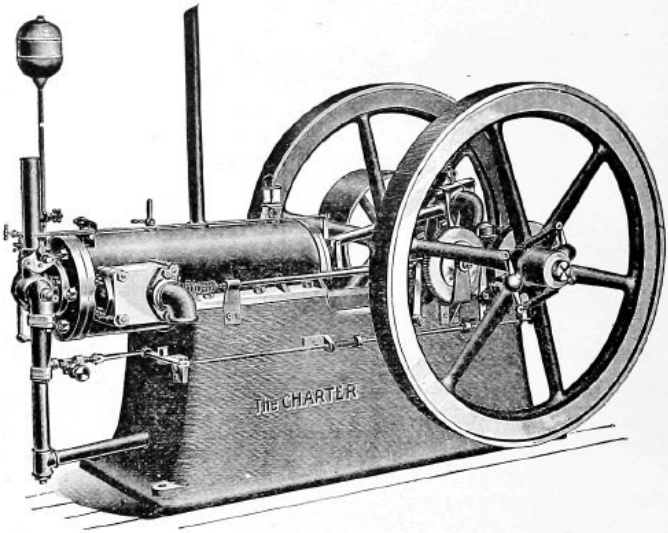
Speed 400 revolutions. Regular pulley 8 inch diameter by 5 inch face.

WOODPECKER PUMPING RIG.



Weighs 950 lbs.; occupies a space 100 inches long, 28 inches wide, 55 inches high, and has Iron Walking Beam and Stands. Price $175 00

CHARTER GAS ENGINES.



4 to 16 H. P. Horizontal.

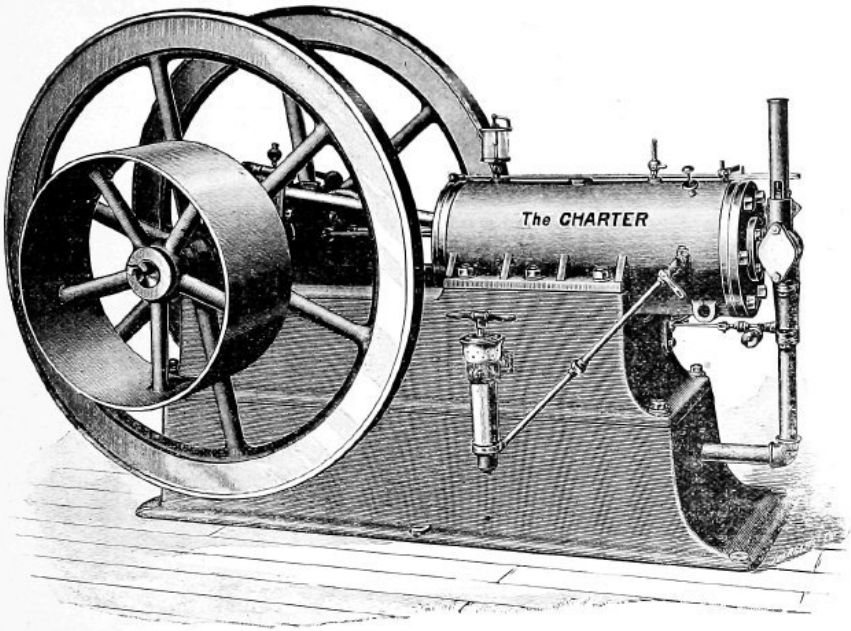
Showing Governor Side.

The extreme simplicity of the CHARTER is evident, as it has no small or delicate parts, and its moving parts being reduced to the minimum number, it is so simple and compact that it is next to impossible to get out of order.

The simplicity of the steam engine, without the boiler and its complication and danger, has been equaled by the CHARTER. Even assuming that the steam be furnished by a boiler, say off the premises and to which no thought need be given, the CHARTER runs and governs itself better and with less attention than a steam engine. Under all variations of load the CHARTER maintains its even motion; and if the full load be thrown off suddenly, the CHARTER cannot "run away," for the governor ceases giving fuel and there are no impulses on the piston till the speed is reduced to the point where the governor admits fuel. The CHARTER is ready to be started at any time and there is no waste, as is the case with a steam plant, nor necessity for banked fires, etc.

There is furnished with each Engine:

Gasoline Supply Tank 2½ gallons capacity for 1½ H. P. Vertical.
Gasoline Supply Tank one barrel capacity for all sizes Horizontals.
Two Lengths of Pipe to connect Supply Tank and Engine.
Burner Tank with Burner for heating igniting tube, connected.
Exhaust Pot or Muffler, connected to engine.
One Length Exhaust Pipe.
Electric Ignitor with Best and Most Expensive Battery or Dynamo, Spark Coil and Switch with all sizes Horizontals and Portables.
Pump and Match Striker with 20 H. P. and larger.
Wrenches, Screw Driver, Pliers, Oil Can, one gallon of Cylinder Oil, Waste, Asbestos Packing, Book of Directions.
Water Tank or Tanks connected to Engine or Water Pump with all sizes Horizontals.

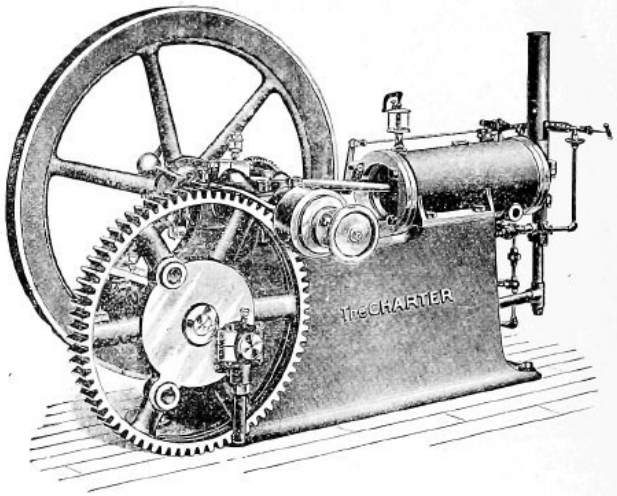


20, 25, 30 and 40 H. P. Horizontal.

Showing opposite to Governor Side and Starting Pump.

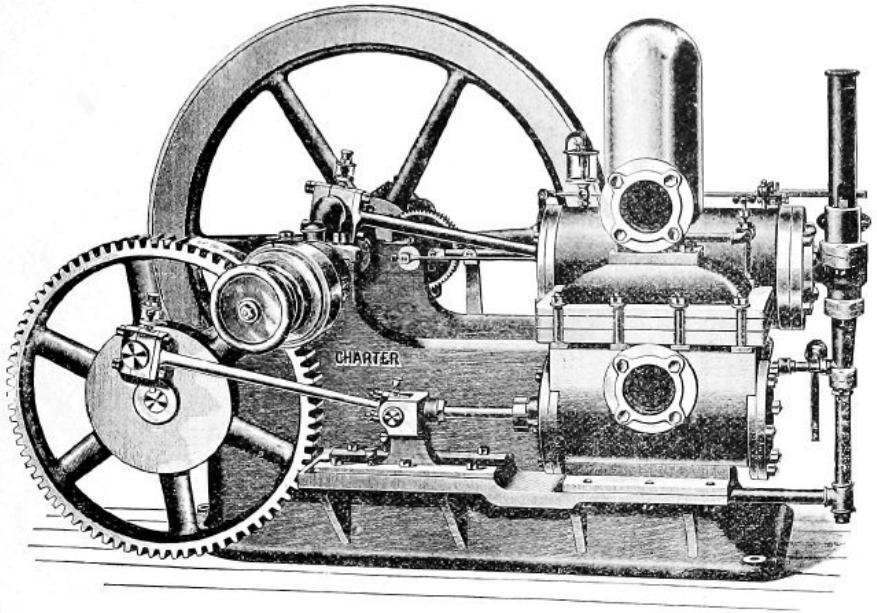
Actual H. P.		Revolutions.	Pulley.	Floor Space.	Height.	Shipping Weight Complete.
Vertical	1½	350	8x 6	24x24 in.	36 in.	700 lbs.
Horizontal	4	275	12x 8	5x 3 ft.	40 "	2,000 "
	6	250	16x10	6x 3 " 9 in.	45 "	3,000 "
	8	250	18x12	7 ft. 6 in. x 4 ft.	50 "	3,500 "
	10	250	20x12	7 " 6 " x 4 "	50 "	4,000 "
	13	225	24x14	8 " 6 " x 4 " 6 in.	57 "	5,000 "
	16	225	28x14	8 " 6 " x 4 " 6 "	57 "	5,500 "
	20	200	32x16	10x5 ft.	68 "	7,000 "
	25	200	36x16	10x5 "	68 "	8,000 "
	30	175	40x12	12x6 "	69 "	10,000 "
	40	175	44x14	12x6 "	69 "	11,000 "

HORIZONTAL CHARTER WITH PUMPING GEAR.



The cut shows the CHARTER with special base carrying the Pumping Gear for use over deep wells. It is self-contained and can be readily attached to any deep well Pump Head, or can be used in connection with a Walking Beam if preferred. The gearing is machine-cut and practically noiseless. Everything used in construction is the best, both in material and workmanship.

H. P. of Engine.	Revolutions per Minute.	Ratio of Gears.	Strokes in inches.	Floor Space.	Shipping Weight.
3	250	5 to 1	8, 10 and 12	3x5 ft. 6 in.	1,400 lbs.
4½	250	5 " 1	10, 14 " 18	3 ft. 6 in. x 7 ft.	2,400 "
6	250	6 " 1	12, 18 " 24	4x8 ft.	3,000 "
8	250	6 " 1	12, 18 " 24	4x8 "	3,500 "
10	250	6 " 1	12, 18 " 24	4x8 "	4,000 "

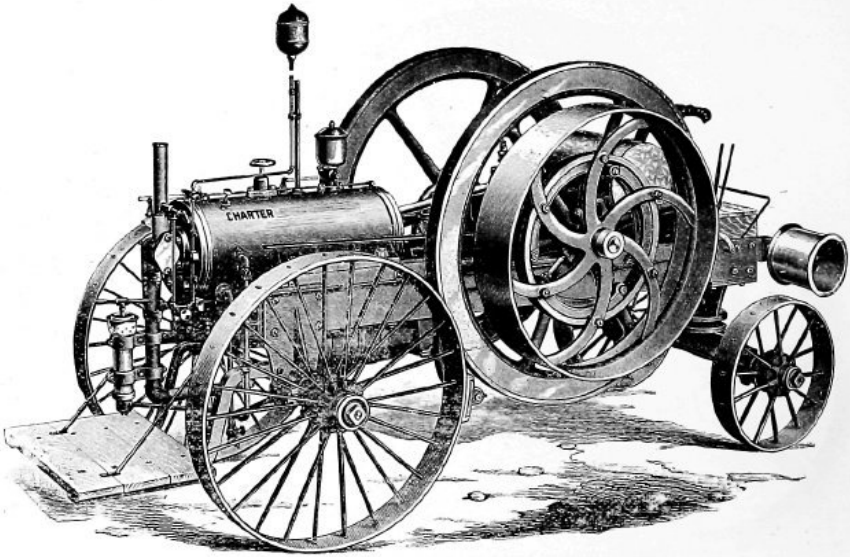


This outfit can be mounted on ordinary trucks and moved to different points for irrigating or any purpose that water be desired for, without the expense and delay of piping. The pump is substantially built, all the bearings and working parts being fitted with the best of material, and the cylinder is brass-lined. The gearing is machine-cut and practically noiseless.

This type of pump is available only where the source of water supply is not more than 25 feet below the place where the pump will set.

The engine is fitted with Electric and Tube Ignitors, also pump to raise the gasoline from low tank if desired.

H. P. of Engine.	Size of Pump.	Gallons per Min.	Height.	Revs. per Min. of Pump Gear.	Suction.	Discharge	Floor Space.	Shipping Weight.
3 Actual	4 x 8 in.	40	150 ft.	50	2½ in.	2½ in.	40x72 in.	1,800 lbs.
	5 x 8 "	60	100 "	50	3 "	2½ "	40x72 "	1,850 "
	6 x 8 "	80	75 "	50	3 "	3 "	40x72 "	1,900 "
	6½ x 8 "	100	60 "	50	3½ "	3½ "	40x72 "	1,900 "
4½ Actual	4 x 8 "	40	300 "	50	2½ "	2½ "	48x84 "	2,700 "
	5 x 8 "	60	200 "	50	3 "	2½ "	48x84 "	2,725 "
	6 x 8 "	80	150 "	50	3 "	3 "	48x84 "	2,800 "
	6½ x 8 "	100	120 "	50	3½ "	3½ "	48x84 "	2,825 "
	6½ x10 "	120	100 "	45	4 "	4 "	48x84 "	2,900 "
	7 x10 "	140	80 "	45	4 "	4 "	48x84 "	2,925 "
	7½ x10 "	160	70 "	45	4 "	4 "	48x84 "	3,000 "
	8 x10 "	185	60 "	45	4 "	4 "	48x84 "	3,050 "



20 and 25 H. P. Charter Portable.

Showing Idler Pulley.

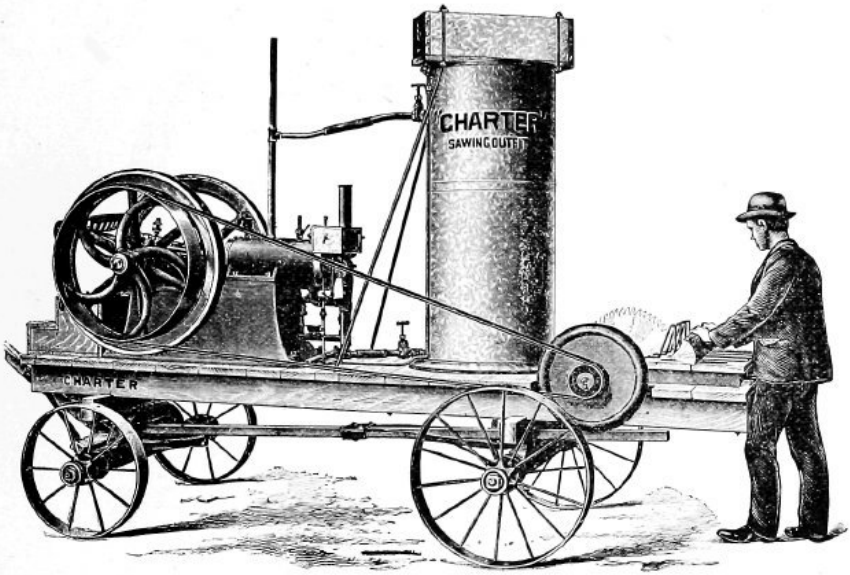
The adaptability of this Engine as a "portable power" is noted at a glance. It can be used anywhere a steam engine can and has greater efficiency, is lighter in weight and costs less to run. Especially suited to drive Threshers, Feed Grinders, Corn Shellers and Portable Mills.

Actual Horse Power.	Revolutions.	Clutch Pulley.	Shipping Weight.
8	250	30x 6½ in.	3,750 lbs.
10	250	30x 6½ "	4,000 "
13	225	40x 8½ "	5,200 "
16	225	40x 8½ "	6,000 "
20	200	50x10½ "	7,600 "
25	200	50x10½ "	7,800 "

Fitted with Tank and Cooling Device.

THE GASOLINE TANK has capacity for over a day's run and is shown back of the seat.

CHARTER SAWING OUTFIT.



The Sawing Outfit shown on this page illustrates another of the many applications of the Gasoline Engine. The Outfit was designed to be a simple portable Sawing Rig that could be easily handled and hauled around. It is substantially built. The frame of wagon is of hard wood and the wheels are of iron.

It is fitted with a Sliding Table for holding the wood so that the labor of sawing is reduced to the minimum. It is very compact, and efficient for the purpose intended, fully meeting the demand for a simple cord-wood sawing rig.

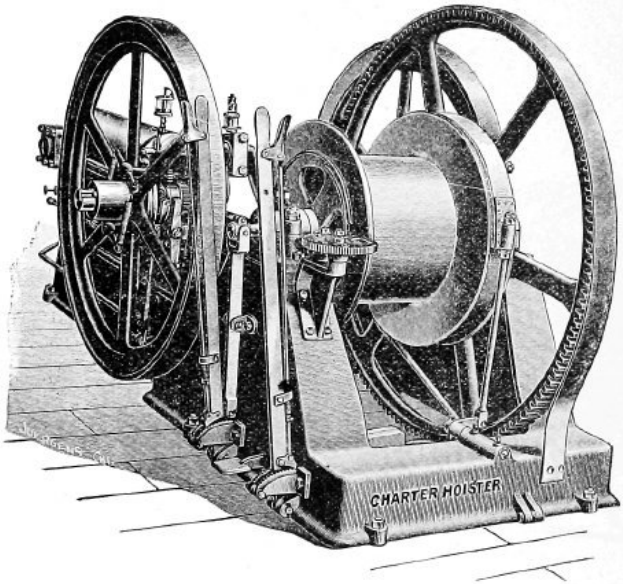
The engine can be used for other work also.

Table of Sawing Outfits with Tongue.

Size of Engine.	Speed.	Size of Saw.	Weight.
4 actual H. P.	275 revolutions	22 or 24 in.	3,050 lbs.
6 " "	250 "	22 " 24 "	3,575 "
8 " "	250 "	22 " 24 "	4,350 "

These outfits can be arranged for Pole Sawing at a small additional cost.

THE CHARTER AND HOIST COMBINED.

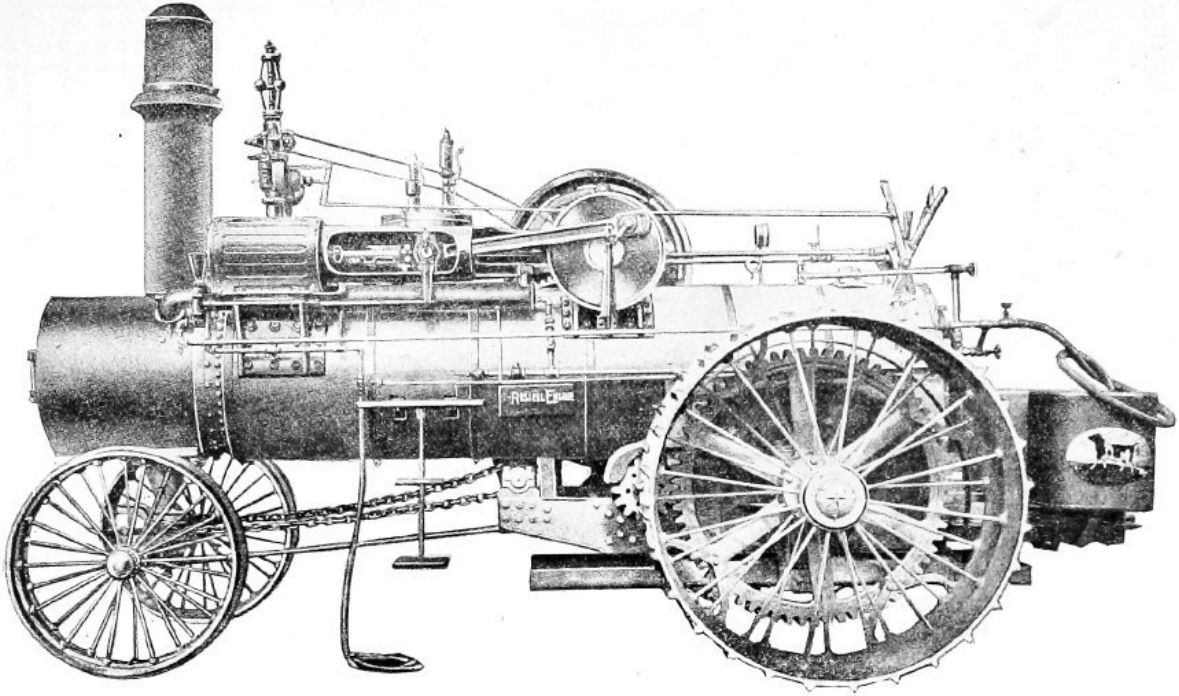


IT IS PROVIDED WITH A FRICTION CLUTCH that is easily operated, and so constructed that there is no end pressure on the journals when the load is being hoisted. Means are provided for taking up the wear of the clutch shoes.

A POWERFUL BRAKE IS PROVIDED, so the load can be held at any point and lowered at will.

A SPEEDING DEVICE IS FURNISHED, operated by the treadle, shown in cuts, with which the operator can vary the speed of the engine through a wide range of revolutions, thus enabling the load to be picked up easily, and then increasing the speed as fast as desired.

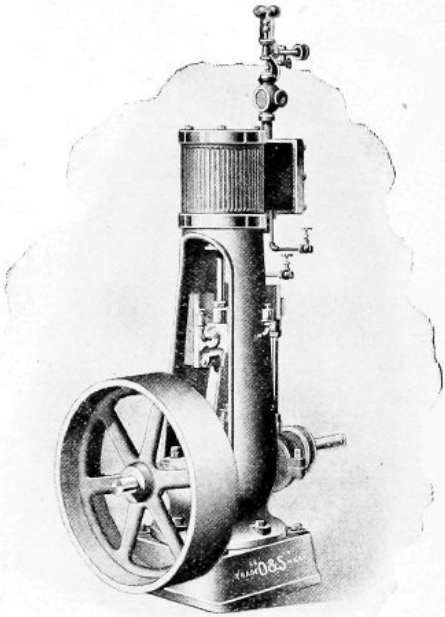
Actual H. P.	Teeth in Gears.		Drum.		Hoisting Speed.	Gross Load.	Size Steel Rope.	Rope in One Layer.	Shipping Weight.
	Gear.	Pinion.	Diam.	Face.					
6	138	21	18 in.	14 in.	180 ft.	900 lbs.	½ in.	135 ft.	4,000 lbs.
13	150	25	20 "	16 "	175 "	2,000 "	½ "	165 "	7,800 "
16	150	25	20 "	16 "	175 "	2,500 "	⅝ "	135 "	8,200 "
20	108	18	24 "	18 "	195 "	2,800 "	⅝ "	180 "	11,500 "
25	108	18	24 "	18 "	195 "	3,500 "	⅝ "	180 "	12,500 "
30	96	16	28 "	20 "	225 "	3,500 "	¾ "	200 "	17,500 "
40	96	16	28 "	20 "	225 "	4,700 "	¾ "	200 "	18,500 "



THE RUSSELL TRACTION ENGINE.

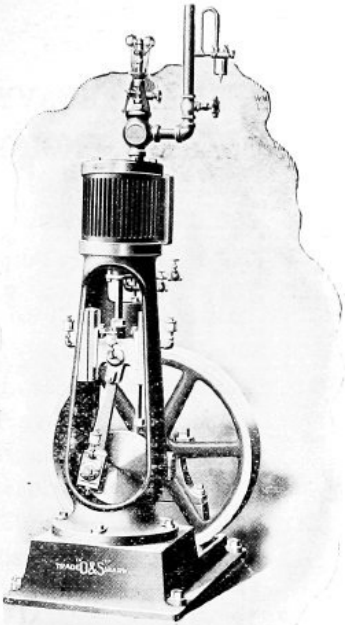
Size shown in cut: 9x13 inches with Jacket, mounted on Straw-Burner Boiler. Write for full information of entire line.

CLASS A CENTER-CRANK VERTICAL ENGINES.



FIVE SIZES—5, 7, 10, 14 and 20 Horse Power.

Horse-power as usually rated	5	7	10	14	20
Size of Cylinder, inches	5 x 5	6 x 6	7 x 7	8 x 8	9 x 9
Revolutions per minute	250	200	190	180	160
Size of Steam-Pipe, inches	¾	1	1¼	1½	2
Size of Exhaust-Pipe, inches	1	1¼	1½	2	2½
Diameter of Shaft, inches	1 1/16	1 1/16	2⅜	2 1/16	2 1/16
Diameter of Fly-Wheel, inches	20	24	32	36	42
Face of Fly-Wheel, inches	5	6	7	8	9
Height from floor to Centre of Shaft, in	12	14	17½	20	24
	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Height to Top of Cylinder	3 7	4 6	5 1	5 8	6 4
Floor Space required in inches square	15	18	24	27	30
Weight of Engine, pounds	425	700	1150	1600	2200
Price of Bare Engine	$138 50	$174 80	$240 12	$319 64	$400 16
Price of Oil-Cups (four)	2 60	2 60	2 92	2 92	2 92
Price of Sight-Feed Lubricator	3 50	3 80	4 56	4 56	5 52
Price of Throttle Valve and Nipples	1 50	1 80	2 10	2 28	3 40
Price of Governor	16 00	18 00	21 00	25 00	30 00
Price of Governor Belt	90	1 00	1 30	1 60	2 00
Price of Engine and Trimmings	$163 00	$202 00	$272 00	$356 00	$444 00
Price of Crating for Export	$4 00	$4 50	$5 00	$6 00	$7 00
Price of Foundation Bolts and Washers	3 50	4 00	4 50	5 50	6 00



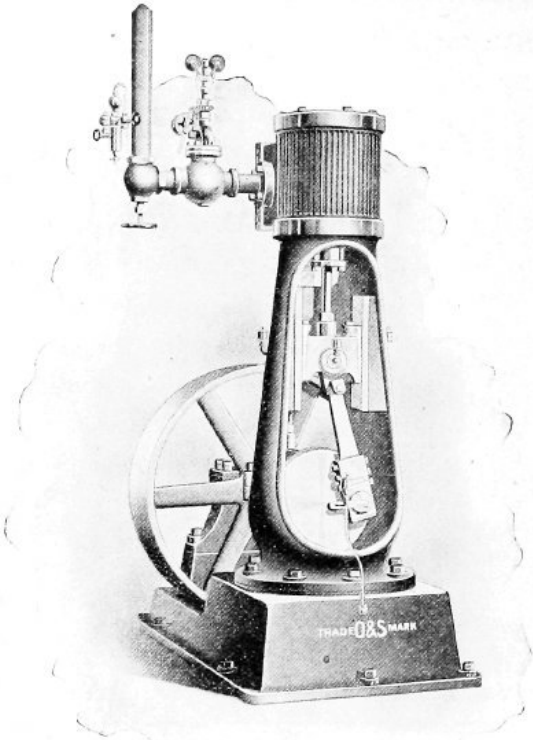
CLASS B

VERTICAL ENGINES.

We present this style of Engine as the most desirable form for general purposes where small powers are required. They are very strong, heavy in construction, but well proportioned, and will stand hard work and high speed.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-Power as usually rated	1½	3	5	7	10	14	20
Size of Cylinder, inches	3 x 3	4 x 4	5 x 5	6 x 6	7 x 7	8 x 8	9 x 9
Revolutions per minute	300	250	250	200	190	180	160
Size of Steam-Pipe, inches	¾	¾	¾	1	1¼	1½	2
Diameter of Exhaust-Pipe, inches	¾	1	1	1¼	1½	2	2½
Diameter of Shaft, inches	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16
Diameter of Fly-Wheel, inches	12	16	20	24	32	36	42
Face of Fly-Wheel, inches	3	4	5	6	7	8	9
Height from Floor to Centre of Shaft, inches	9	10	12	14	18	20	24
	Ft. In.	Ft.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Height to Top of Cylinder	2 6	3	3 7	4 5	5 1	5 8	6 6
Floor Space occupied, inches	13 x 23	15 x 28	18 x 36	22 x 40	25 x 46	28 x 50	30 x 56
Weight of Engine, pounds	225	350	600	900	1300	1800	2400
Price of Bare Engine	$65 40	$107 05	$138 50	$174 80	$240 12	$319 64	$400 16
Price of Oil-Cups (four)	2 40	2 40	2 60	2 60	2 92	2 92	2 92
Price of Sight-Feed Lubricator	3 25	3 25	3 50	3 80	4 56	4 56	5 52
Price of Throttle Valve and Nipples	1 25	1 50	1 50	1 80	2 10	2 28	3 40
Price of Governor	14 00	16 00	16 00	18 00	21 00	25 00	30 00
Price of Governor Belt	70	80	90	1 00	1 30	1 60	2 00
Price of Engine complete	$87 00	$131 00	$163 00	$202 00	$272 00	$356 00	$444 00
Price of Crating for Export	$3 00	$3 50	$4 00	$4 50	$5 00	$6 00	$7 00
Price of Foundation Bolts and Washers	2 50	3 00	3 50	4 00	4 50	5 50	6 00



EXTRA HEAVY CLASS B ENGINES.

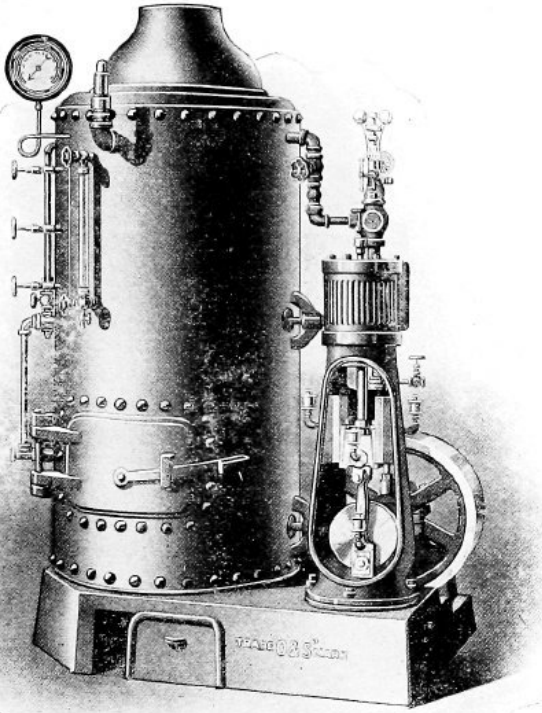
Built Expressly for Mill and Factory Purposes.

We desire to call especial attention to this style of Engine. It is very heavy in all its parts. We have hundreds of them in successful operation in the various Iron Mills of the country. The rods and shafts are made of steel and the "Brasses" of the connecting rod are phosphor bronze.

Horse-Power as usually rated	25	35	50	75
Size of Cylinder, inches	10 x 10	12 x 12	14 x 14	16 x 16
Revolutions per minute	160	160	150	140
Size of Steam-Pipe, inches	2½	3	3½	4
Diameter of Exhaust-Pipe, inches	3	3½	4	4½
Diameter of Shaft, inches	3¼	3¾	4¼	5¼
Diameter of Fly-Wheel, inches	44	48	52	54
Face of Fly-Wheel, inches	10	12	14	16
Height from Floor to Centre of Shaft, inches	26	28	30	31½
	Ft.	*Ft. In*	*Ft. In.*	*Ft. In.*
Height to Top of Cylinder	7	7 8	8 6	9 4
Floor Space occupied, inches	36 x 62	40 x 70	41 x 80	41 x 85
Weight of Engine, pounds	3200	4400	6400	8000
Price of Bare Engine	$513 90	$681 28	$865 50	$1101 50
Price of Oil Cups (four)	2 92	3 20	3 20	3 50
Price of Sight-Feed Lubricator	5 52	5 52	6 80	7 50
Price of Throttle Valve and Nipples	5 66	7 50	11 50	13 00
Price of Governor	40 00	50 00	60 00	71 00
Price of Governor Belt	2 00	2 50	3 00	3 50
Price of Engine complete	$570 00	$750 00	$950 00	$1200 00
Price of Crating for Export	$8 00	$10 00	$12 50	$15 00
Price of Foundation Bolts and Washers	7 00	9 60	10 00	12 00

CLASS B VERTICAL ENGINES.

Combined with Suitable Boilers.



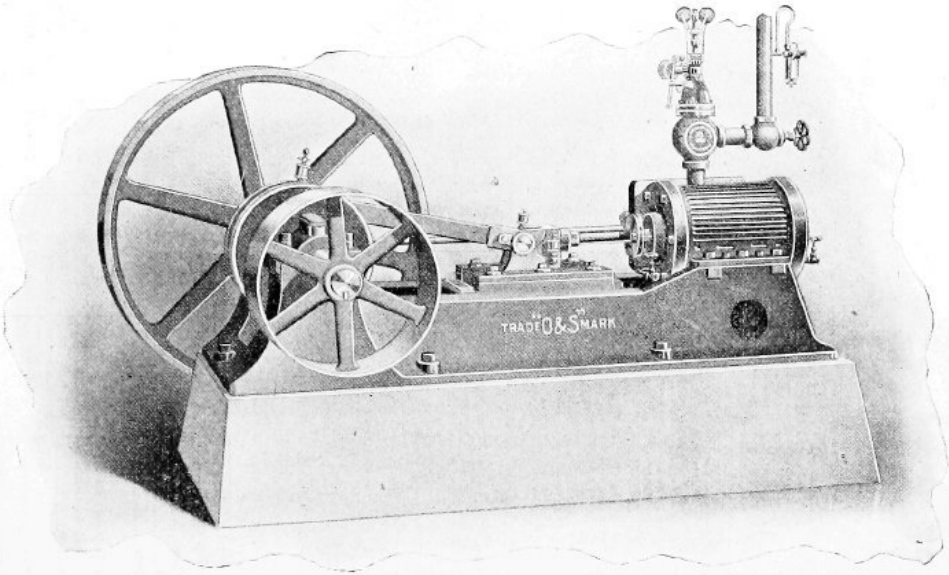
Horse-power as usually rated	1½	3	5	7	10
*Size of Cylinder, inches	3 x 3	4 x 4	5 x 5	6 x 6	7 x 7
Size of Boiler, inches	20 x 36	24 x 48	27 x 60	30 x 72	36 x 72
Number of 2-inch Tubes	16	24	30	42	60
	Ft. In.	*Ft. In.*	*Ft. In.*	*Ft. In.*	*Ft. In.*
Height from Floor to Top of Boiler	3 8	4 8	6 9	6 10	6 10
Floor Space required, inches	22 x 33	27 x 40	31 x 43	36 x 55	42 x 66
Shipping Weight, pounds	650	1600	2100	2900	3600
Price complete as shown	$160 00	$260 00	$310 00	$410 00	$550 00
Price of Crating for Export	$4 50	$5 00	$5 50	$6 00	$6 50

*For other dimensions of Engine, see page 611.

The complete outfit as shown includes the complete Engine fixtures, all necessary Boiler fixtures, with Injector fitted and connections made between Engine and Boiler.

Exhaust-pipe and stack will be furnished when so desired at an extra cost.

CLASS A CENTER CRANK HORIZONTAL ENGINES.



EIGHT SIZES—10, 15, 20, 25, 35, 50, 60 and 75 Horse Power.

CLASS A CENTER-CRANK HORIZONTAL ENGINES.

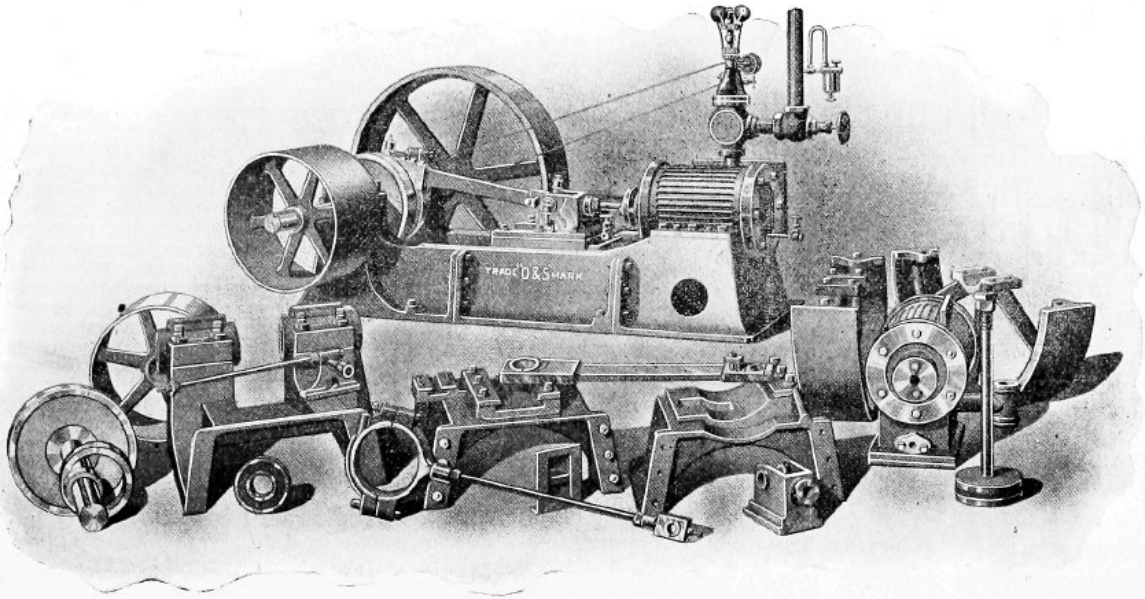
This Engine is especially adapted for duty where two belts are desired, the band Fly-Wheel being turned with crown face. Pump and Heater can be attached to the 10, 15, 20, 25, 35, 50 and 60 Horse Power of this pattern when so desired.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-power as usually rated	**10**	**15**	**20**	**25**	**35**	**50**	**60**	**75**
Size of Cylinder, inches	7 x 10	8 x 10	9 x 12	10 x 12	11 x 13	12 x 15	13 x 16	14 x 18
Revolutions per minute	190	190	160	160	160	150	150	150
Size of Steam-Pipe, inches	1½	2	2	2½	2½	3	3	3½
Size of Exhaust-Pipe, inches	2	2½	2½	3	3	3½	3½	4
Size of Pulley, inches	18 x 8	20 x 10	20 x 10	24 x 12	24 x 12	30 x 14	30 x 14	36 x 16
Size of Fly-Wheel, inches	36 x 7	40 x 8	44 x 9	44 x 9	48 x 10	52 x 11	60 x 14	72 x 16
Diameter of Shaft, inches	2 13/16	2 15/16	3¼	3¼	3¾	4¾	4¾	5¾
Length of Journal, inches	8½	10	10½	11	11	12	12	13
Width and Length of Bed-Plate, inches	21 x 69	24 x 76	26 x 78	28 x 91	28 x 91	30 x 102	30 x 102	34 x 116
Weight of Engine complete, pounds	1700	2300	2900	3400	4300	5800	7000	9500
Price of Bare Engine without Pulley or Fly-Wheel	$222 58	$242 92	$327 42	$373 20	$431 50	$550 88	$654 88	$791 50
Price of Pulley	8 06	9 22	9 22	13 90	13 90	16 90	16 90	27 30
Price of Fly-Wheel	28 60	41 60	46 80	46 80	58 50	71 50	97 50	130 00
Price of Oil-Cups (four)	2 60	2 92	2 92	2 92	2 92	3 58	3 58	4 56
Price of Sight-Feed Lubricator	4 56	4 56	4 56	5 52	5 52	7 14	7 14	7 14
Price of Throttle Valve and Nipples	2 10	2 28	2 28	5 66	5 66	7 50	7 50	11 50
Price of Governor	25 00	30 00	30 00	40 00	40 00	50 00	50 00	60 00
Price of Governor Belt	1 50	1 50	1 80	2 00	2 00	2 50	2 50	3 00
Price of Engine complete with Trimmings	$295 00	$335 00	$425 00	$490 00	$560 00	$710 00	$840 00	$1035 00
Price of Crating for Export	$8 00	$9 00	$10 00	$12 00	$12 00	$14 00	$14 00	$18 00
Price of Pump and Heater	28 00	28 00	34 00	34 00	34 00	40 00	40 00	.....
Price of Foundation Bolts and Washers	6 00	6 50	7 00	8 00	8 00	10 00	10 00	14 00

CLASS A HORIZONTAL ENGINES.

Made Sectional for Mountain Transportation.



THREE SIZES—10, 15 and 20 Horse Power.

CLASS A HORIZONTAL ENGINES.

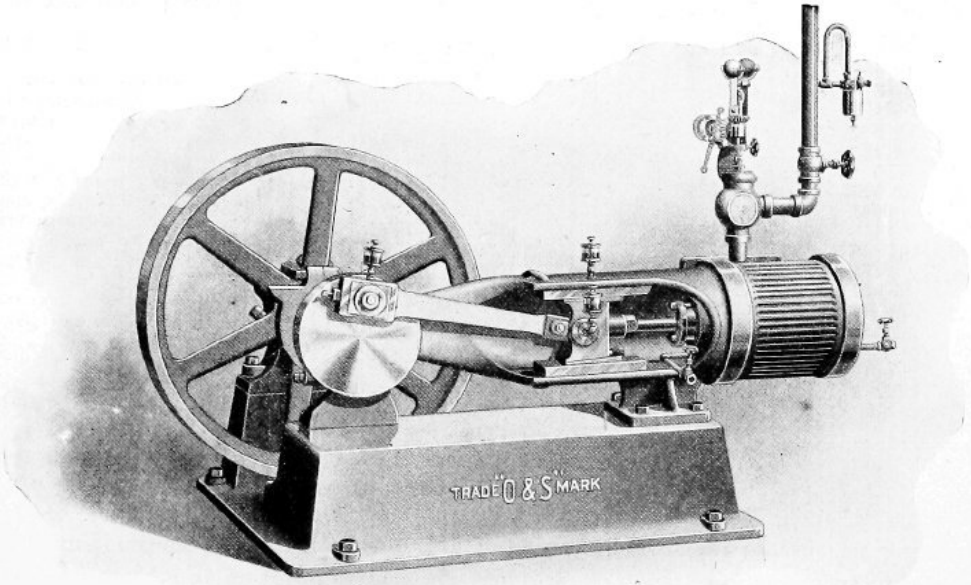
Made Sectional for Mountain Transportation.

We show here our Class A Horizontal Engine cut up in sections for mountain transportation. The several parts are well secured by means of reamed holes and turned bolts. For shipment each piece is carefully numbered before crating, so there will be no trouble putting the machine together at destination.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-Power as usually rated	**10**	**15**	**20**
Size of Cylinder, inches	7 x 10	8 x 10	9 x 12
Revolutions per minute	190	190	160
Size of Steam-Pipe, inches	1½	2	2
Size of Exhaust-Pipe, inches	2	2½	2½
Size of Pulley, inches	18 x 8	20 x 10	20 x 10
Size of Fly-Wheel, inches	36 x 7	40 x 8	44 x 9
Diameter of Shaft, inches	2⅛	2⅛	3¼
Floor Space required, inches	21 x 69	24 x 76	26 x 78
Weight of Heaviest Piece, pounds	203	279	323
Weight of Complete Engine, pounds	1700	2300	2900
Price of Bare Engine, without Pulley or Fly-Wheel	$272 58	$302 92	$407 42
Price of Pulley	8 06	9 22	9 22
Price of Fly-Wheel	28 60	41 60	46 80
Price of Oil-Cups (four)	2 60	2 92	2 92
Price of Sight-Feed Lubricator	4 56	4 56	4 56
Price of Throttle Valve and Nipples	2 10	2 28	2 28
Price of Governor	25 00	30 00	30 00
Price of Governor Belt	1 50	1 50	1 80
Price of Engine complete with Trimmings	$345 00	$395 00	$505 00
Price of Crating for Export	$12 00	$15 00	$18 00
Price of Pump and Heater	28 00	28 00	34 00
Price of Foundation Bolts and Washers	6 00	6 50	7 00

CLASS B HORIZONTAL ENGINES.



FIVE SIZES—5, 7, 10, 14 and 20 Horse Power.

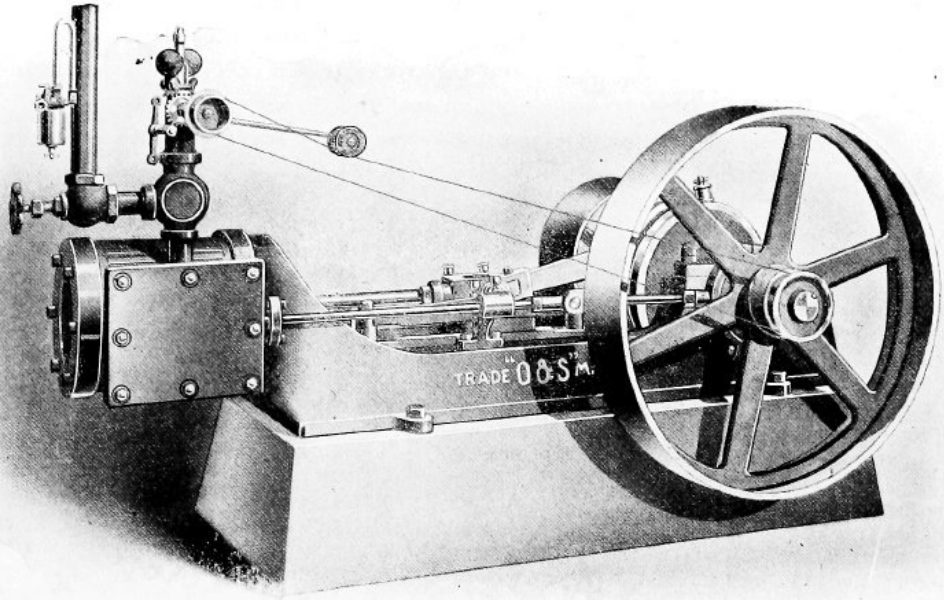
CLASS B SELF-CONTAINED DISC-CRANK HORIZONTAL ENGINES.

In presenting this form of Horizontal Engine, we feel confident that it describes one peculiarly suitable for all kinds of work where high speed and smooth running are required. The engine being all complete on a single cast iron base, prevents any of its working parts from becoming deranged or out of line. The material is of the best that can be obtained, and the workmanship excelled by none. In fact, in all our Engines we could call attention to the quality and material of our work. We do not aim to make the cheapest Engine in the market, but we do aim to make the best of this class. We spare no pains in making them perfect in every detail.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-power as usually rated	**5**	**7**	**10**	**14**	**20**
Size of Cylinder, inches	5 x 5	6 x 6	7 x 7	8 x 8	9 x 9
Revolutions per minute	250	200	190	180	160
Size of Steam-Pipe, inches	¾	1	1¼	1½	2
Diameter of Shaft, inches	1 1/16	1 1/16	2 3/8	2 3/8	2 3/8
Diameter of Fly Wheel, inches	20	24	32	36	42
Face of Fly-Wheel, inches	5	6	7	8	9
Floor Space required, inches	29 x 34	31 x 38	41 x 46	46 x 52	48 x 57
Weight of Engine, pounds	600	900	1300	1800	2400
Price of Bare Engine	$138 50	$174 80	$240 12	$319 64	$400 16
Price of Oil-Cups (four)	2 60	2 60	2 92	2 92	2 92
Price of Sight-Feed Lubricator	3 50	3 80	4 56	4 56	5 52
Price of Throttle Valve and Nipples	1 50	1 80	2 10	2 28	3 40
Price of Governor	16 00	18 00	21 00	25 00	30 00
Price of Governor Belt	90	1 00	1 30	1 60	2 00
Price of Engine with Trimmings	$163 00	$202 00	$272 00	$356 00	$444 00
Price of Crating for Export	$4 00	$4 50	$5 00	$6 00	$7 00
Price of Foundation Bolts and Washers	3 50	4 00	4 50	5 50	6 00

CLASS C HORIZONTAL ENGINES.



FIVE SIZES—6, 8, 10, 12 and 15 Horse Power.

CLASS C HORIZONTAL ENGINES.

We have added this line of Horizontal Engines to our Standard Line, in order to fill a long-felt want among our various patrons. The Engine is well made throughout, yet, owing to its simplicity of construction, it can be produced at less cost than more elaborate designs.

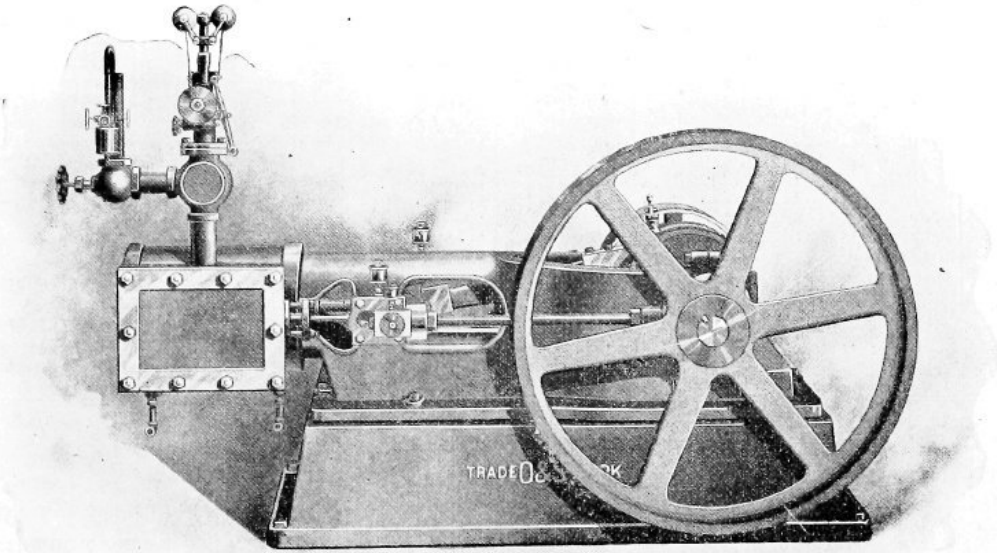
The rods are made of steel, the crank shaft of charcoal iron, the "Brasses" of phosphor bronze, and the bearings of the best babbitt.

We make five sizes as below.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-Power as usually rated	**6**	**8**	**10**	**12**	**15**
Size of Cylinder, inches	5 x 7½	6 x 7½	7 x 10	7½ x 10	8 x 10
Diameter of Steam-Pipe, inches	1	1¼	1½	1½	1½
Diameter of Exhaust-Pipe, inches	1¼	1½	2	2	2
Diameter of Shaft, inches	2⅜	2⅜	2 13/16	2 13/16	2 13/16
Diameter and Face of Wheel, inches	24 x 6	24 x 6	30 x 6¾	30 x 6¾	36 x 7¼
Diameter and Face of Pulley, inches	14 x 7	14 x 7	16 x 7½	18 x 7½	18 x 7½
Revolutions per minute	250	225	200	180	180
Floor Space required for Base, inches	14½ x 47½	14⅓ x 47½	16 x 57	16 x 57	16 x 57
Approximate Shipping Weight, lbs.	700	800	1200	1300	1500
Price of Bare Engine	$120 20	$136 60	$176 64	$190 64	$197 44
Price of Pulley	6 00	6 00	7 00	8 00	8 00
Price of Fly-Wheel	12 00	12 00	20 40	20 40	28 60
Price of Oil-Cups (four)	2 60	2 60	2 80	2 80	2 80
Price of Sight-Feed Lubricator	3 50	3 80	4 56	4 56	4 56
Price of Throttle Valve and Nipples	1 80	2 10	2 40	2 40	2 40
Price of Governor	18 00	21 00	25 00	25 00	25 00
Price of Governor Belt	90	90	1 20	1 20	1 20
Price of Engine complete	$165 00	$185 00	$240 00	$255 00	$270 00
Price of Crating for Export	$6 00	$6 00	$8 00	$8 00	$9 00
Price of Foundation Bolts and Washers	5 00	5 00	6 00	6 00	6 00

CLASS D HORIZONTAL ENGINES.



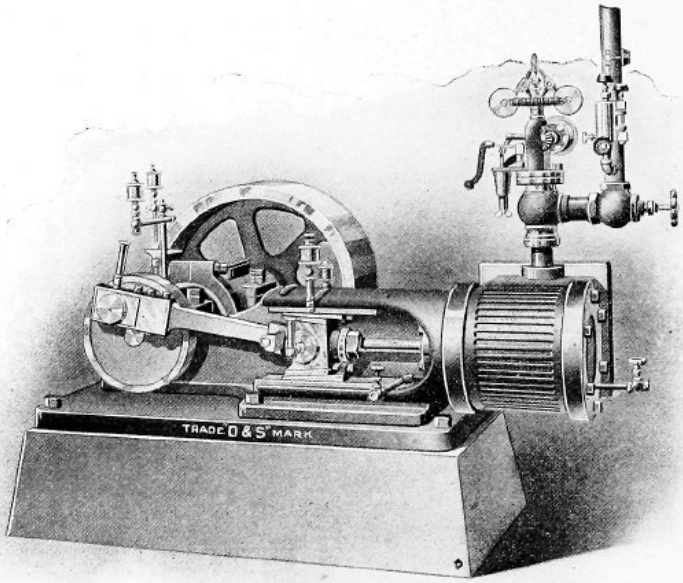
FIVE SIZES—8, 10, 15, 20 and 25 Horse Power.

CLASS D HORIZONTAL ENGINES.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-Power as usually rated	8	10	15	20	25
Size of Cylinder, inches	6 x 8	7 x 9	8 x 10	9 x 11	10 x 12
Revolutions, per minute	225	210	190	180	160
Size of Steam-Pipe, inches	1¼	1½	2	2	2½
Size of Exhaust-Pipe, inches	1½	2	2½	2½	3
Size of Pulley, inches	14 x 7	16 x 7½	18 x 8	20 x 10	24 x 12
Size of Fly-Wheel, inches	32 x 6	36 x 7	40 x 8	44 x 9	48 x 10
Diameter of Shaft, inches	2⅝	2 13/16	2 15/16	3¼	3¼
Length over all, inches	68	74	86	88½	99½
Width across Crank, inches	38	44	50	54	60
Weight, less Sub-Base, pounds	1100	1500	2000	2700	3400
Weight, with Sub-Base, pounds	1400	1900	2500	3300	4100
Price of Bare Engine, without Pulley, Fly-Wheel,	$213 34	$238 66	$277 96	$345 36	$387 70
Price of Pulley	6 00	7 00	8 00	9 00	13 00
Price of Fly-Wheel	22 40	28 60	41 60	46 80	58 50
Price of Oil-Cups (four)	2 60	2 60	2 92	2 92	3 10
Price of Sight-Feed Lubricator	4 56	4 56	5 52	5 52	5 52
Price of Throttle-Valve and Nipples	2 10	2 28	3 40	3 40	4 68
Price of Governor	21 00	25 00	30 00	30 00	40 00
Price of Governor Belt	1 00	1 30	1 60	2 00	2 50
Price of Sub-base	15 00	20 00	25 00	30 00	35 00
Price of Engine complete as shown	$288 00	$330 00	$396 00	$475 00	$550 00
Price of Boxing for Export	$7 00	$8 00	$9 00	$10 00	$12 00
Price of Foundation Bolts and Washers	5 00	6 00	7 00	8 00	9 00

O. & S. BLACK HAWK ENGINE.



FOUR SIZES—10, 25, 50 and 75 Horse Power.

BLACK HAWK HORIZONTAL ENGINES.

The great objection to plain slide-valve engines on the market to-day is that their strength has been sacrificed to either economy of material or beauty of design.

A simple glance at the Engine here shown will convince any one that we have combined strength and beauty. This design is so strong that it can be adapted to very high speed, heavy duty and continuous operation.

For isolated electric light plants, saw-mills or mill-work of any description, it is without a peer.

Equipped with extra heavy balance-wheel, automatic stop-governor and automatic oiling devices, it will run as steadily and smoothly as any automatic engine, yet, owing to its simplicity, does not require the attention of an experienced engineer.

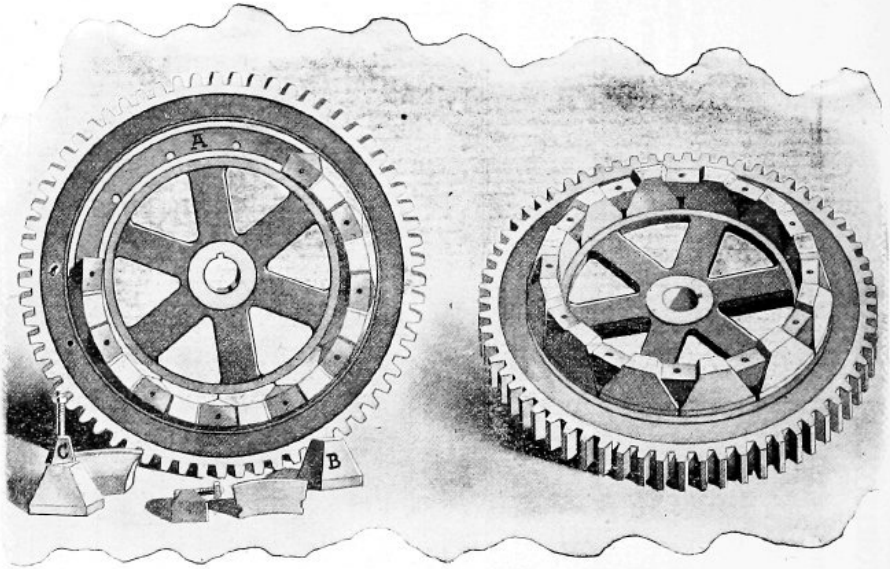
Particular attention is called to the size of the several parts and the total weight of the Engine. We have named it

"O. & S." BLACK HAWK.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-Power (based on tabulated speed and 50 lbs. mean effective pressure	**10**	**25**	**50**	**75**
Size of Cylinder, inches	6 x 6	8 x 8	10 x 10	12 x 12
Diameter of Steam-Pipe, inches	1½	2	2½	3
Diameter of Exhaust-Pipe, inches	2	2½	3	3½
Revolutions per minute	350	300	265	235
Diameter and Face of Fly-Wheel, inches	24 x 8	32 x 11	40 x 13	48 x 16
Weight of Fly-Wheel, pounds	350	800	1300	1900
Diameter of Crank-Shaft, inches	2 5/16	3½	4¼	4¾
Diameter of Crank-Pin, inches	2	2 3/16	3⅛	3½
Diameter of Piston-Rod, inches	1 5/16	1 5/16	1 7/16	2
Floor Space occupied by Base, inches	30 x 40	36 x 50	40 x 62	44 x 74
Weight of complete Engine, pounds	1800	3000	4400	6700
Price of Bare Engine without Fly-Wheel	$209 36	$325 00	$481 50	$653 60
Price of Fly-Wheel	28 50	65 00	104 00	156 00
Price of Wiping Oil-Cups	14 30	14 30	14 30	14 30
Price of Sight-Feed Lubricator	4 56	4 56	5 52	7 10
Price of Throttle Valve and Nipples	2 28	3 40	4 68	7 50
Price of Automatic Stop-Governor	29 50	36 00	48 00	59 00
Price of Governor-Belt	1 50	1 74	2 00	2 50
Price of Engine and Trimmings	$290 00	$450 00	$660 00	$900 00
Price of Crating for Export	$6 00	$8 00	$10 00	$14 00
Price of Foundation Bolts and Washers	6 00	8 00	10 00	14 00

THE WERN FRICTION.



Used on all Friction "O. & S." Hoisting Engines.

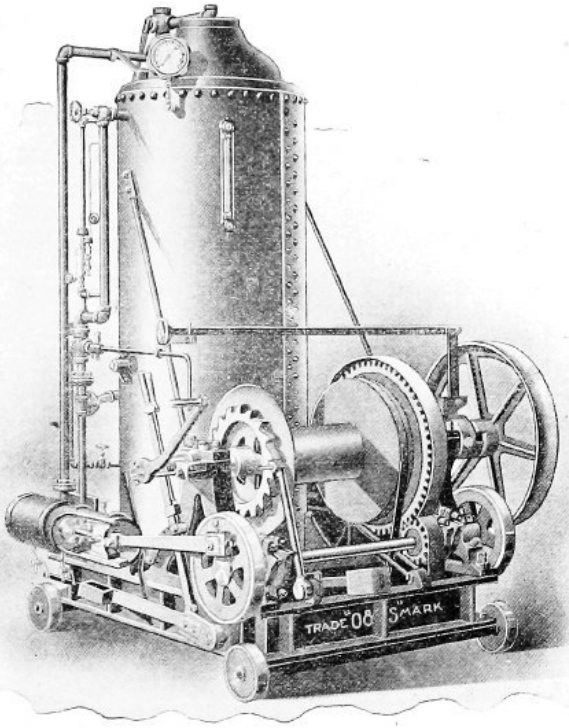
DESCRIPTION OF FRICTION.

The groove "A" is turned to standard templets, thereby insuring the groove to be always the same size. The blocks "B" are made of hickory and are absolutely interchangeable; they are inserted in the groove "A" and held in place by the cast-iron wedge "C."

The advantage of this style friction is that it is not necessary to take either the drum or gear wheel off of the engine for the purpose of renewing the friction blocks. These blocks being interchangeable, a set can be shipped from the factory, and all that is necessary to make the change is to take out the thrust-key, move the drum back against the thrust pedestal, loosen the jam-nuts which tighten the wedge "C," then remove the worn-out blocks and replace them with new blocks, tighten up the jam-nuts on the wedge "C," put the drum back into place, and adjust the thrust-key, when the engine is again ready for operation.

We invite a careful study of the friction here shown, for we believe that engineers will appreciate the ease by which this friction can be renewed.

CONTRACTORS' HOISTING ENGINE.



Simple, Convenient and Durable.

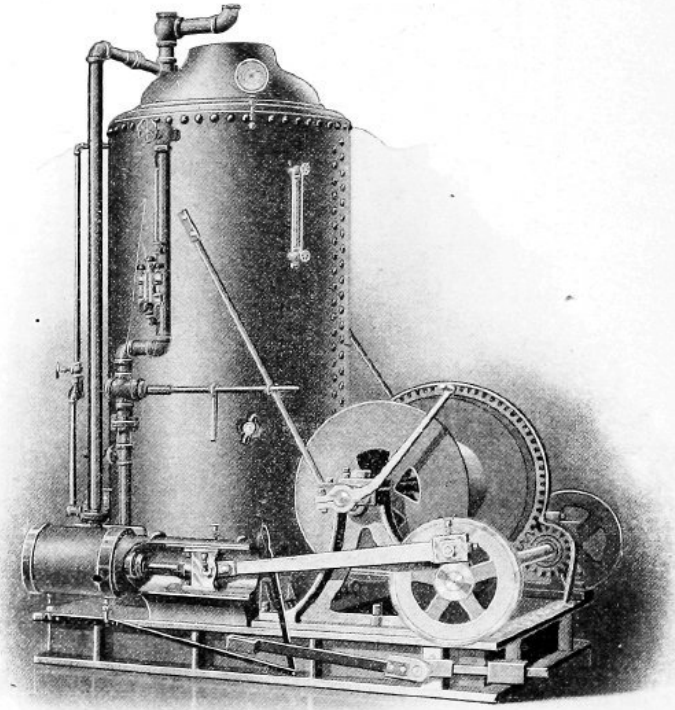
The Drum is fitted with our standard "Wern" Friction and can be used as a regular friction hoist for pile driving, etc.

The Drum Shaft is fitted with a large sheave and the Engines are made reversible, for the purpose of running material elevators when so desired. This sheave is capable of being thrown out by means of a clutch arrangement, when the Engine is needed for other hoisting, and the saving of rerigging is thereby avoided.

The Engine is equipped with suitable footbreak and all the working levers are within reach of the operator at one position.

Size Number of Engine	5
Horse Power as usually rated	10
Size of Cylinder, inches	5x7
Diameter of Drum, "	8
" " Flanges, "	22
Length of Drum between Flanges, inches	18
Diameter of Gear Wheel, inches	25
" " Pinion, inches	6
" " Sheave, "	30
Size of Boiler, inches	30x72
Number of 2 inch Tubes	55
Floor Space required, inches	43x58
Suitable Weight for Pile Driving Hammer	1,500
Approximate Shipping Weight, lbs	4,200
Price complete as shown	$1,050 00
" of Crating for export	18 00

DOUBLE CYLINDER, SINGLE DRUM, HORIZONTAL HOISTING, WITH BOILER.



All Complete on One Base.

THREE SIZES—10, 15 and 25 Horse Power.

DOUBLE CYLINDER, FRICTION DRUM HOISTING ENGINES.

With Boiler and Fixtures, Complete, on One Bed Plate.

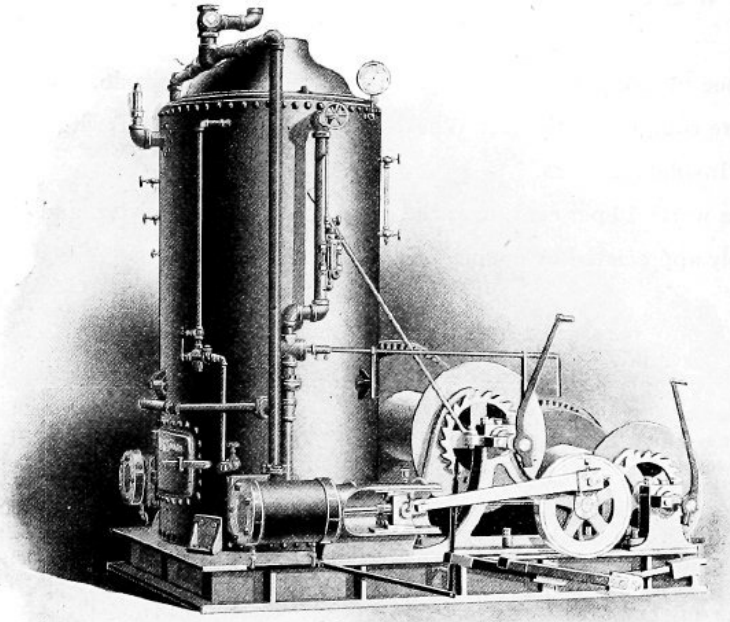
We beg to call attention to the fact that all our Horizontal Hoisting Engines are equipped with Gear Wheels cut from the solid metal with Brown & Sharpe Involute Cutters.

This is worth 10 per cent. over the price of any other Hoister, and is an item readily appreciated by engineers.

TABLE OF DIMENSIONS AND PRICE LIST.

Size Number of Engine	**7½**	**8**	**9**
Horse-Power as usually rated	10	15	25
Size of Cylinder, inches	5 x 7	6¼ x 8	7 x 10
Diameter of Drum, inches	12	14	14
Diameter of Flanges, inches	22	26	30
Length of Drum between Flanges, inches	20	25	32
Diameter of Gear-Wheel, inches	25	26½	32½
Diameter of Pinion, inches	6	6½	8
Size of Boiler, inches	30 x 72	36 x 84	42 x 84
Number of 2-inch Tubes	55	60	84
Floor Space required, inches	42 x 60	48 x 70	60 x 81
Suitable Weight for Pile-Driving Hammer	1500	2000	4000
Approximate Shipping Weight, pounds	4000	5300	8500
Price complete, as shown	$850 00	$1060 00	$1350 00
Price of Crating for Export	$15 00	$22 00	$29 00

DOUBLE CYLINDER, DOUBLE DRUM, HORIZONTAL HOISTING ENGINE, WITH BOILER.



The Gear and Pinion cut from Solid Metal.

THREE SIZES—10, 15 and 25 Horse Power.

DOUBLE CYLINDER, DOUBLE FRICTION DRUM HOISTING ENGINES.

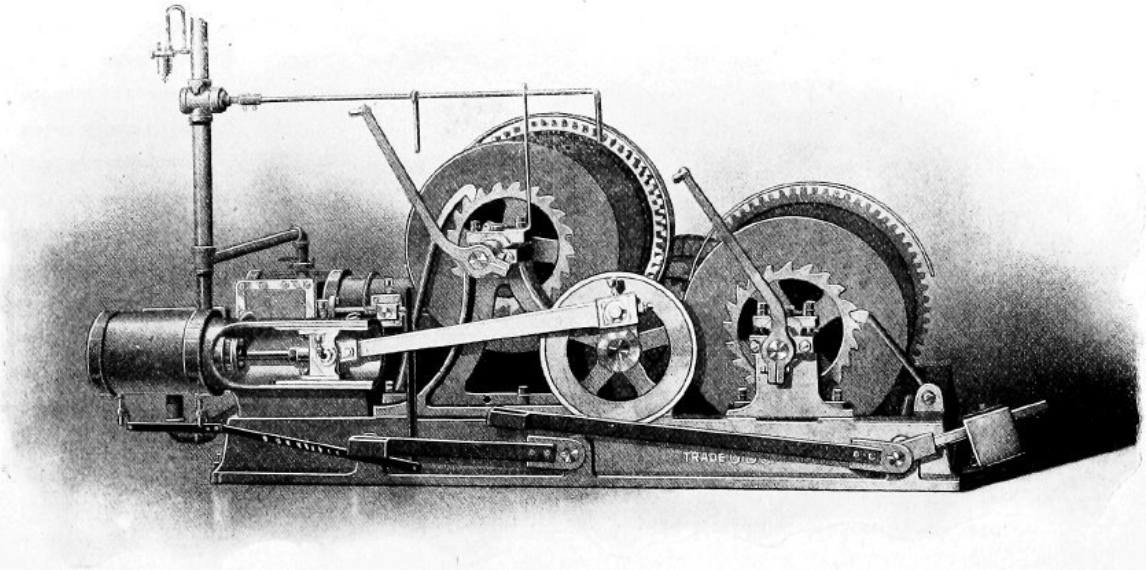
With Boiler and Fixtures Complete on One Bed Plate.

Especially adapted for Quarry and Bridge Work, Building, Mason Work, etc.

TABLE OF DIMENSIONS AND PRICE LIST.

Size Number of Engine	**70**	**70½**	**71**
Horse-Power as usually rated	10	15	25
Size of Cylinder, inches	5 x 7	6¼ x 8	7 x 10
Diameter of Drums, inches	12	14	14
Diameter of Flanges, inches	22	26	30
Length of Drums between Flanges, inches	20	25	32
Size of Boiler, inches	30 x 72	36 x 84	42 x 84
Number 2-inch Tubes	55	60	84
Floor Space required, inches	42 x 78	48 x 88	60 x 104
Weight Hoisted, Single Rope, usual Speed, pounds	2000	2500	4000
Approximate Shipping Weight, pounds	5500	7000	9000
Price complete as shown	$1080 00	$1320 00	$1520 00
Price of Crating for Export	$16 00	$24 00	$32 00

DOUBLE CYLINDER, DOUBLE DRUM HORIZONTAL HOISTING ENGINES, WITHOUT BOILER.



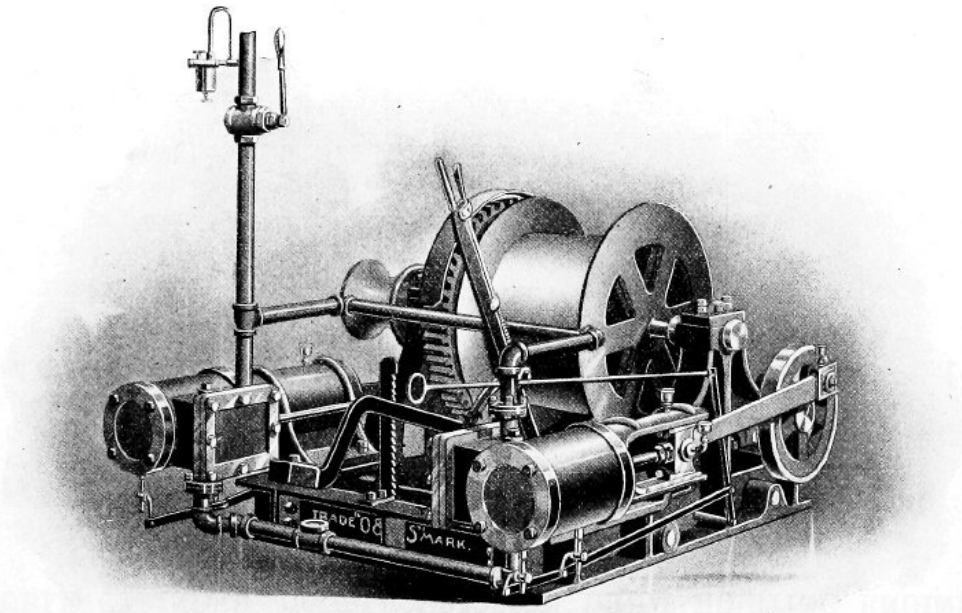
THREE SIZES—10, 15 and 25 Horse Power.

DOUBLE CYLINDER, DOUBLE FRICTION DRUM HOISTING ENGINES, WITHOUT BOILER.

TABLE OF DIMENSIONS AND PRICE LIST.

Size Number of Engine	**70½**	**70¾**	**71½**
Horse-Power as usually rated	10	15	25
Size of Cylinder, inches	5 x 7	6¼ x 8	7 x 10
Diameter and Length of Drum, inches	12 x 14	14 x 16	14 x 20
Floor Space required, inches	37 x 72	44 x 81	53 x 96
Weight Hoisted, Single Rope, usual Speed, pounds	2000	2500	4000
Approximate Shipping Weight, pounds	3000	4000	5500
Price complete as shown	$700 00	$860 00	$1010 00
Price of Crating for Export	$12 00	$16 00	$20 00

DOUBLE CYLINDER, LINK MOTION, REVERSIBLE HORIZONTAL HOISTING ENGINES, WITHOUT BOILER.



THREE SIZES—10, 15 and 25 Horse Power.

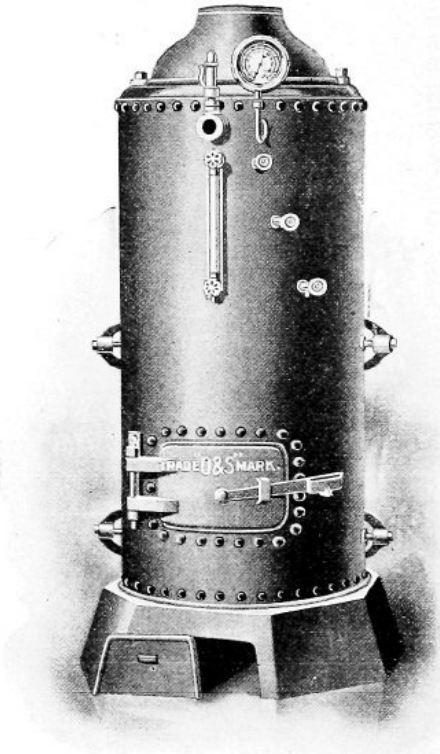
DOUBLE CYLINDER, LINK MOTION, REVERSIBLE HOISTING ENGINES, WITHOUT BOILER.

Breakage is often occasioned by rough Gears. All our Gears on Horizontal Hoisting Engines are cut from *Solid Metal.*

TABLE OF DIMENSIONS AND PRICE LIST.

Size Number of Engine	47½	48	49
Horse-Power as usually rated	10	15	25
Size of Cylinder, inches	5 x 7	6¼ x 8	7 x 10
Diameter of Drum, inches	16	20	24
Diameter of Flanges, inches	28	29	36
Length of Drum between Flanges, inches	12	16	18
Floor Space required inches	35 x 48	42 x 53	51 x 64
Weight Hoisted, Single Rope, usual Speed, pounds	2000	2500	4000
Approximate Shipping Weight, pounds	2000	2300	3000
Price complete as shown	$570 00	$660 00	$780 00
Price of Crating for Export	$10 00	$14 00	$18 00

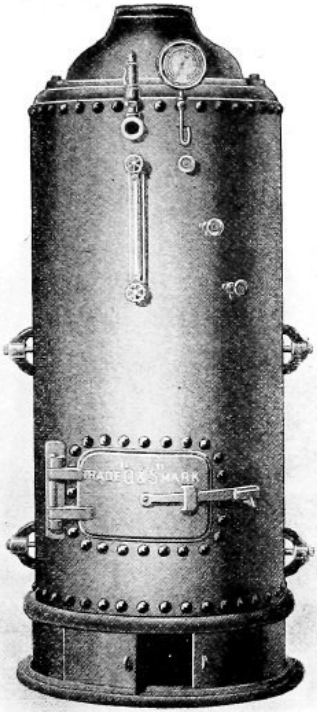
"FULL LENGTH TUBE" VERTICAL TUBULAR BOILERS.



With Octagon Base.

Made in 22 sizes from 1½ to 75 horse power. No trouble to send you full particulars of what you require.

"FULL LENGTH TUBE" VERTICAL TUBULAR BOILERS.

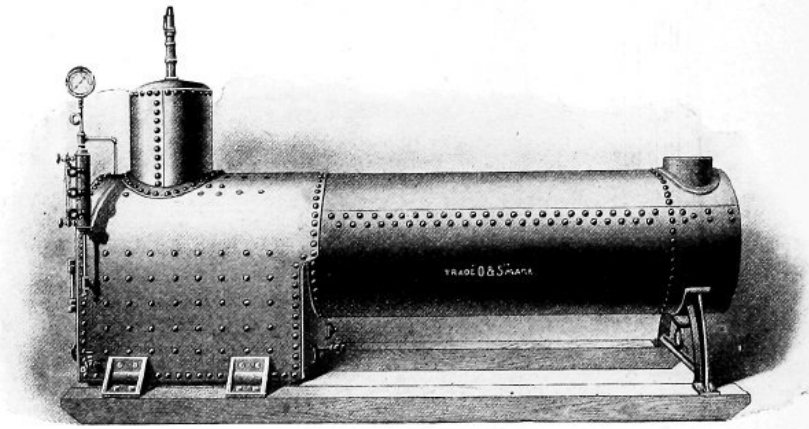


With Round Base.

Particular attention is called to our Round Base. It is equipped with a Wrought Iron Bottom, securely fastened, and has an air space between the bottom of the base and the floor.

By this means the use of brick may be obviated, when using the boiler on a wooden floor, with perfect safety.

WATER FRONT, OPEN BOTTOM LOCOMOTIVE BOILERS.



TEN SIZES—10, 12, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 100 and 125 Horse Power.

PORTABLE BOILER, LOCOMOTIVE STYLE.

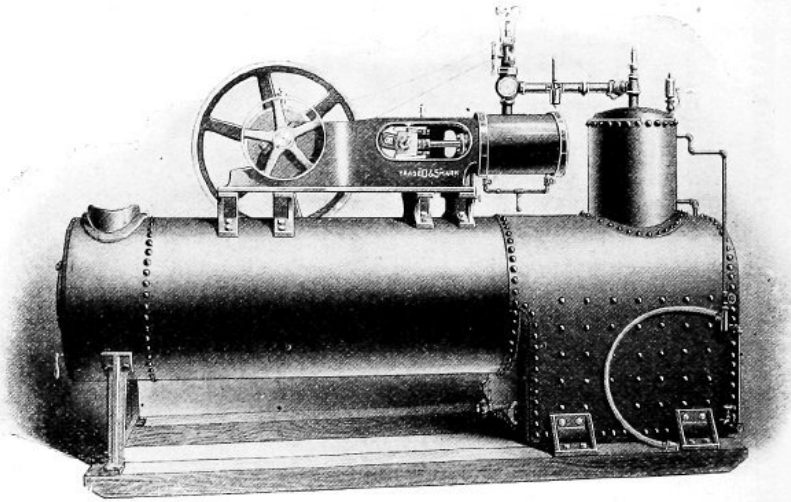
Water Front and Open Bottom.

TABLE OF DIMENSIONS AND PRICE LIST.

Number of Size	3	4	5	6	7	8	9	10	11	12
Horse-Power as usually rated	10	12	15	20	25	30	35	40	50	60
Diameter of Boiler, inches	32	32	32	34	36	36	40	42	48	48
Length of Fire Box, inches	38	38	44	52	52	52	52	54	54	64
Height of Fire Box, inches	33	33	33	36	38	40	42	46	52	52
Width of Fire Box, inches	26	26	26	28	30	30	34	36	42	42
Number of 3-inch Tubes	26	26	26	28	34	34	40	43	56	56
Length of Tubes, inches	66	72	78	90	96	120	102	120	126	144
Thickness of Shell, inches	¼	¼	¼	¼	¼	¼	9/32	9/32	5/16	5/16
Thickness of Furnace Plates, inches	¼	¼	¼	¼	9/32	9/32	9/32	5/16	5/16	5/16
Thickness of Tube Sheets and Heads, inches	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Size of Dome, inches	18 x 22	18 x 22	18 x 22	20 x 24	20 x 24	20 x 24	22 x 26	22 x 28	26 x 30	26 x 30
Diameter of Stack, inches	14	14	14	16	16	16	20	20	22	22
Length of Stack, feet	16	18	20	25	25	25	25	25	35	35
Weight of Bare Boiler on Skids	3125	3375	3625	4100	4650	4800	5400	6500	8000	9500
Weight of Boiler complete, with Fixtures	3875	4125	4450	5100	5800	6000	6700	8000	9500	11000
Price of Bare Boiler on Skids	$310 42	$328 42	$346 46	$402 90	$440 90	$506 86	$560 46	$644 86	$830 34	$898 34
Price of Grates	14 80	14 80	16 76	30 00	30 00	32 30	32 30	37 90	45 00	45 00
Price of Water Column Attached with Cocks	6 00	6 00	6 00	6 00	6 00	8 00	8 00	8 00	10 00	10 00
Price of Water Gauge	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50	1 50
Price of Steam Gauge	2 68	2 68	2 68	2 68	2 68	2 68	2 68	2 68	2 68	2 68
Price of Safety Valve	4 20	4 20	4 20	5 24	5 24	8 52	8 52	8 52	10 50	10 50
Price of Check and Stop Valve	1 60	1 60	1 60	1 60	1 60	2 06	2 06	2 06	2 90	2 90
Price of Whistle	2 00	2 00	2 00	3 00	3 00	3 00	3 00	3 00	4 00	4 00
Price of Blow-off Valve	3 30	3 30	3 30	4 08	4 08	4 08	4 08	4 08	4 08	4 08
Price of Stack	18 50	20 50	22 50	30 00	30 00	30 00	39 40	39 40	60 00	60 00
Price of Boiler Complete, with Fixtures	$367 00	$385 00	$407 00	$487 00	$525 00	$599 00	$662 00	$752 00	$971 00	$1039 00
Price of Crating for Export	$8 00	$8 00	$9 00	$10 00	$10 00	$10 00	$14 00	$14 00	$18 00	$18 00

CLASS D HORIZONTAL ENGINES.

Mounted on Portable Boilers.



FIVE SIZES—8, 10, 15, 20 and 25 Horse Power.

ENGINES MOUNTED ON PORTABLE BOILERS.

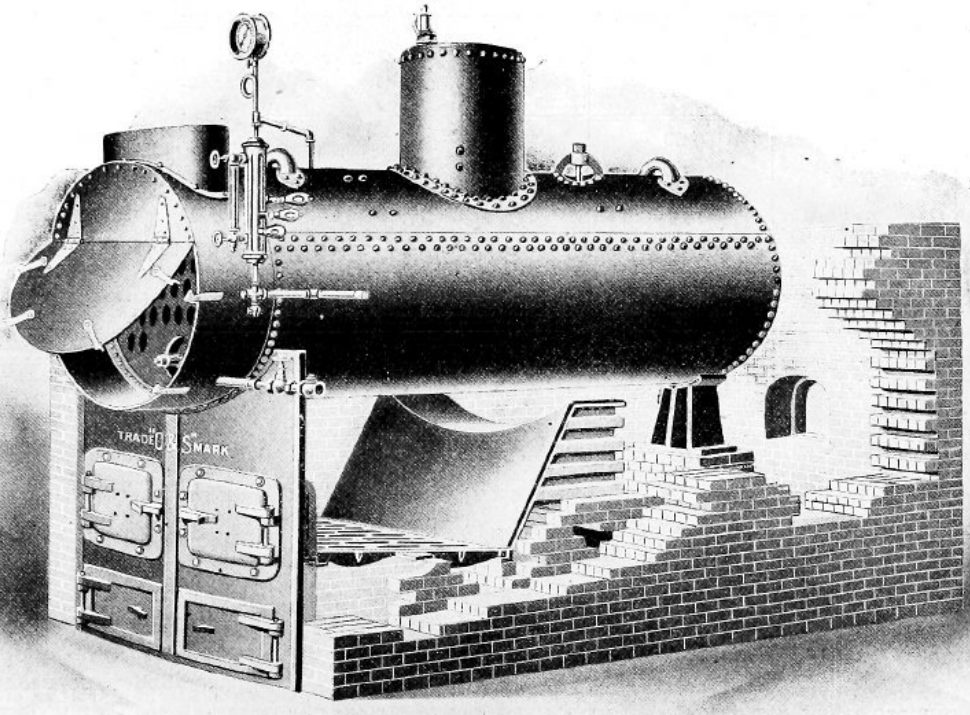
The illustration on the opposite page represents our Class D Horizontal Engine mounted on our standard Locomotive or Portable Boiler. For full particulars of Engine see pages 620 and 621. Full particulars of Boiler, page 639.

We will furnish these outfits with Injector for feeding boiler as desired.

TABLE OF DIMENSIONS AND PRICE LIST.

Horse-Power as usually rated	8	10	15	20	25
Size of Engine Cylinder, inches	6 x 8	7 x 9	8 x 10	9 x 11	10 x 12
Diameter of Boiler, inches	32	32	32	34	36
Length of Furnace, inches	38	38	44	52	52
Height of Furnace, inches	33	33	33	36	38
Width of Furnace, inches	26	26	26	28	30
Number of 3-inch Tubes	26	26	26	28	34
Length of Tubes, inches	66	72	78	90	96
Diameter of Smoke Stack, inches	14	14	14	18	18
Length of Smoke Stack, feet	16	18	20	25	25
Shipping Weight, pounds	5200	5900	6800	8000	9200
Price Complete	$675 00	$735 00	$820 00	$980 00	$1100 00

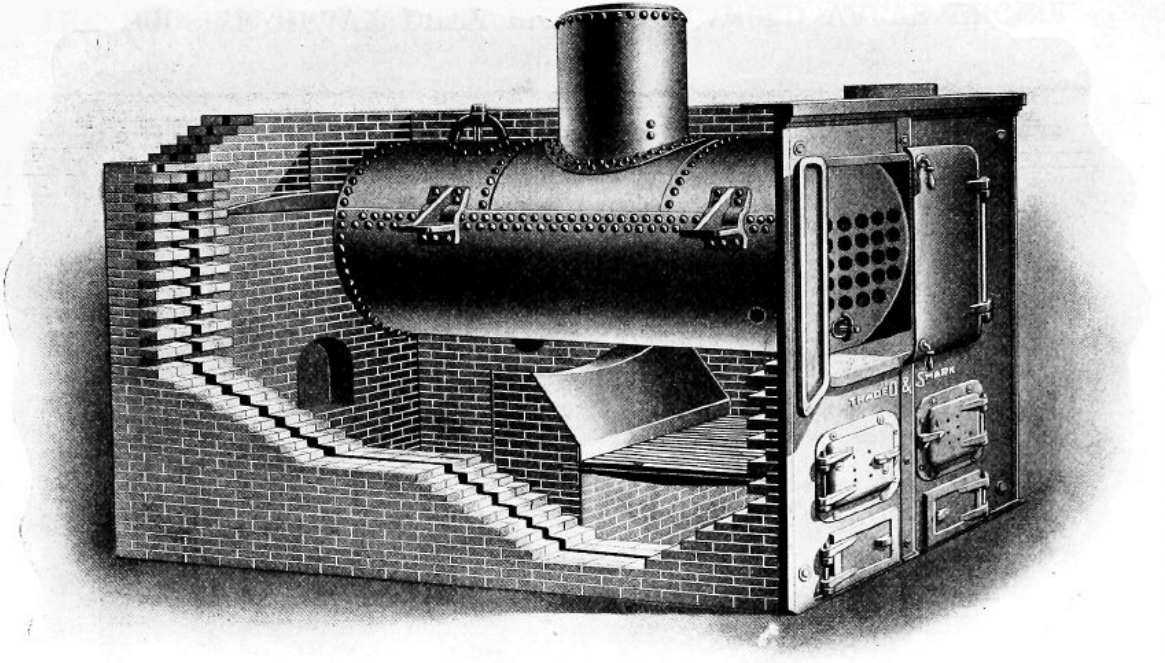
STANDARD BOILER WITH HALF ARCH FRONT SETTING.



Made in 25 Sizes from 10 to 250 Horse Power.

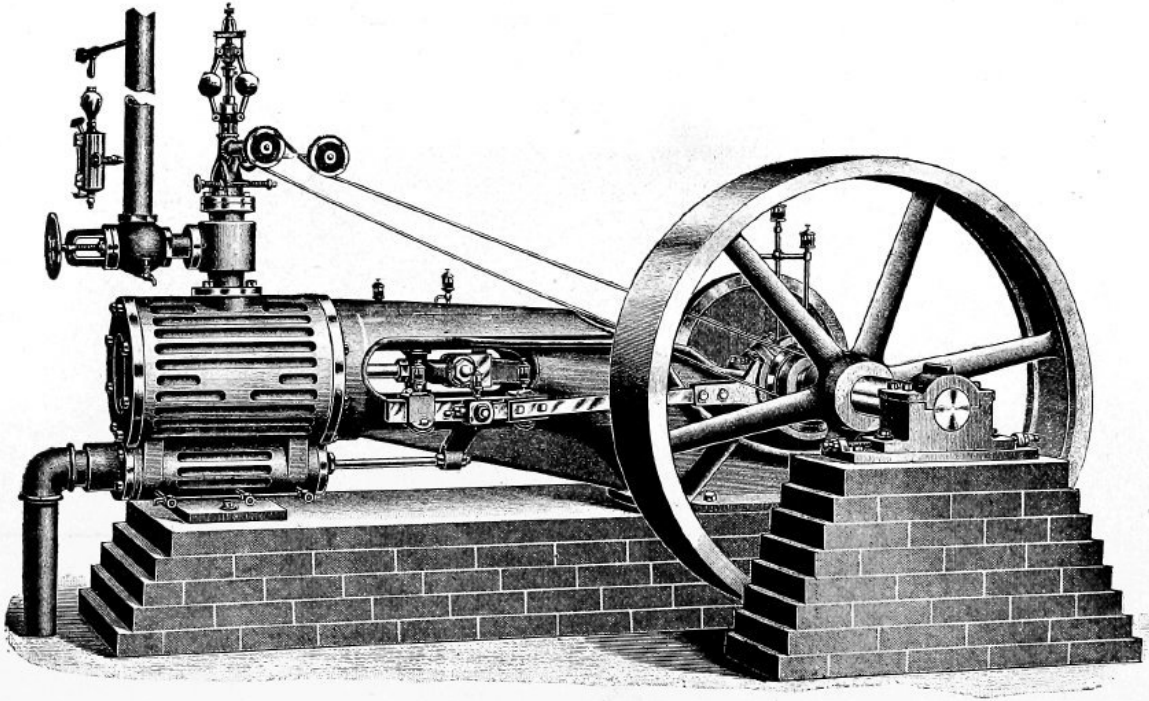
Write for information and prices.

STANDARD BOILER WITH FULL ARCH FRONT SETTING.



Made in 25 Sizes from 10 to 250 Horse Power.

Write for full detail and prices.



THE HOOSIER HEAVY DUTY PISTON BALANCED VALVE ENGINE.

THE HOOSIER HEAVY DUTY PISTON BALANCED VALVE ENGINE.

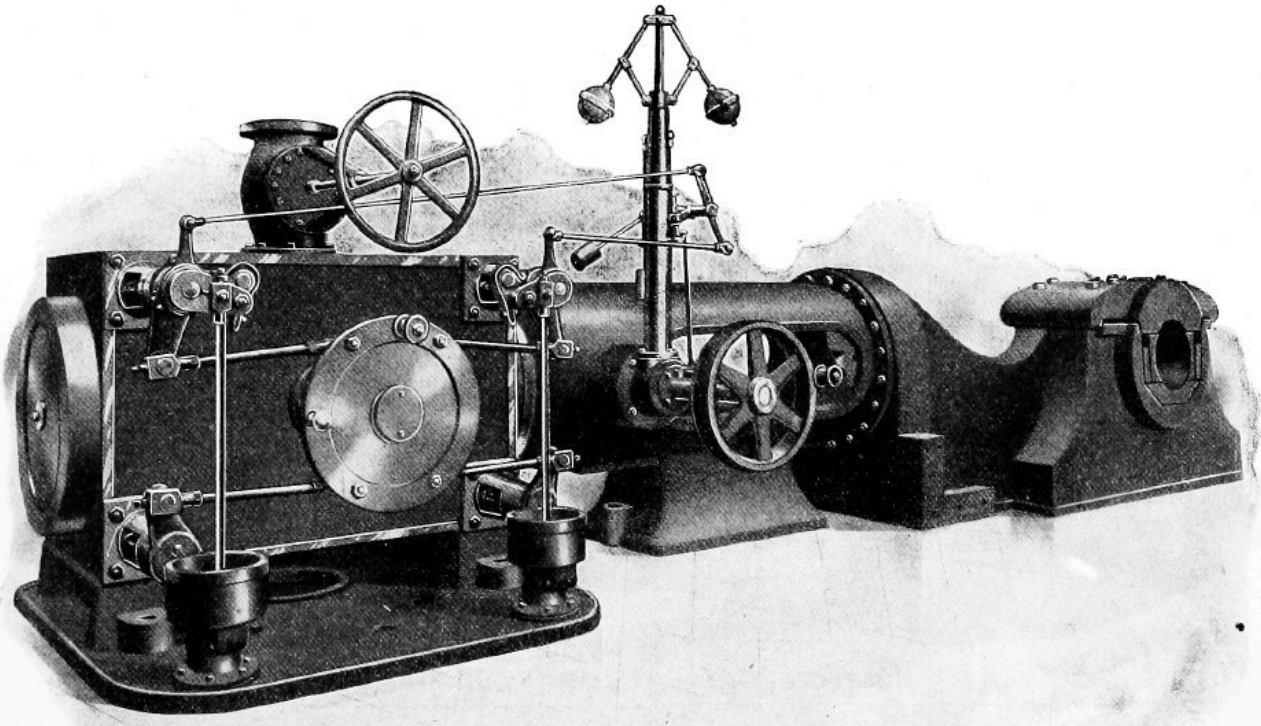
SPECIFICATION AND PRICE LIST.

Horse Power.						Cylinder.		Band Fly Wheel.		
Revol. per Min.	H. P.	Revol. per Min.	H. P.	Revol. per Min.	H. P.	Bore.	Stroke.	Diameter.	Face.	Weight.
225	20	250	24	300	29	8 in.	11 in.	48 in.	12½ in.	800 lbs.
225	25	250	30	300	37	9 "	11 "	54 "	12½ "	1,000 "
200	30	240	39	275	45	10 "	12 "	60 "	14½ "	1,200 "
200	45	240	55	275	65	12 "	12 "	66 "	14½ "	1,500 "
160	55	210	65	240	75	12 "	16 "	72 "	16½ "	1,800 "
160	60	210	75	240	90	13 "	16 "	78 "	16½ "	2,400 "
150	75	190	90	210	100	14 "	18 "	84 "	18½ "	3,800 "
140	90	180	115	200	125	16 "	18 "	96 "	21 "	4,500 "
120	130	135	145	150	160	18 "	24 "	108 "	25 "	6,000 "
120	160	135	180	150	200	20 "	24 "	120 "	26 "	7,000 "

Revol. per Min.	H. P.	Size of Gov'r and Steam Pipe.	Size of Exhaust Pipe.	Shaft.		Space Occupied.		Weight Complete.	Price.
				Diameter.	Length.	Length.	Breadth.		
225	20	2 in.	2½ in.	3⅞ in.	54 in.	100 in.	60 in.	2,300 lbs.	$ 260 00
225	25	2¼ "	3 "	3⅞ "	54 "	103 "	60 "	2,600 "	290 00
200	30	2½ "	3 "	4½ "	58 "	109 "	72 "	4,000 "	360 00
200	45	3 "	3½ "	5 "	68 "	112 "	82 "	4,500 "	435 00
160	55	3 "	3½ "	5 "	68 "	138 "	93 "	5,750 "	525 00
160	60	3½ "	4½ "	5½ "	72 "	141 "	97 "	6,700 "	600 00
150	75	3½ "	5 "	6 "	78 "	160 "	105 "	9,000 "	725 00
140	90	4 "	6 "	6½ "	84 "	166 "	111 "	10,200 "	875 00
120	130	4½ "	6 "	7½ "	96 "	204 "	122 "	17,000 "	1,250 00
120	160	5 "	7 "	8 "	96 "	210 "	122 "	19,000 "	1,500 00

Each Hoosier Engine is furnished with a hammered iron or steel main shaft; out board pillow block on adjustable sole plate; heavy band wheel; Hoosier or King Governor; governor belt; throttle valve; Detroit sight feed cylinder lubricator and connections for same; all necessary oil cups, wrenches and cylinder drain connections. Foundation bolts and plates are furnished when specified.

EXTRA HEAVY DUTY BATES CORLISS.



Showing Valve Motion and Cylinder Sole Plate.

BATES CORLISS ENGINES.

WE are agents for the Celebrated BATES CORLISS ENGINE, of which a brief and condensed statement follows. Estimates and specifications of all types and sizes from 12x30 to 36x72 promptly furnished.

DESIGN AND MATERIAL.

THE CORLISS ENGINE has come to be generally recognized as the standard engine in modern practice. To fill, however, all the various demands on the motor with engines of but one type would hardly be subservient to economy and symmetrical appearance.

We build, therefore, two styles of engines:

Our BATES CORLISS STANDARD BOX GIRDER ENGINE, adapted for all ordinary and lighter service where the steam pressure does not exceed 125 lbs., and where the service is such as not to call for an extraordinarily heavy frame.

Our BATES CORLISS EXTRA HEAVY DUTY ENGINE is designed for all duties where the steam pressure is high, and where the service is of a severe nature, such as in Rolling Mill work. This type is particularly suitable for driving direct connected generators.

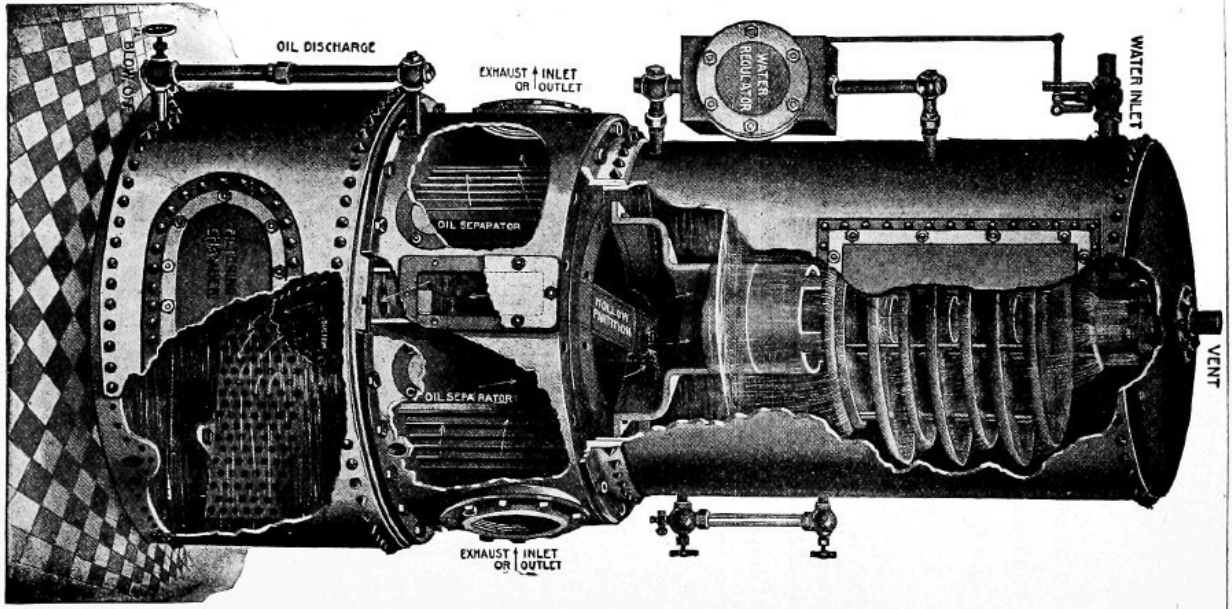
The Corliss Releasing Gear, which at first was considered suitable for only slow speeds, has, little by little, proven itself to be practicable even at the highest speeds desirable, with good economy in view. Particularly is the release in the Bates Corliss Engine, even at the highest rate of speed, effected with very little shock to the governor, thus imposing the minimum amount of work on this most sensitive part of an engine.

The Governor, of the fly-ball pattern, is provided with a movable counter weight, thus affording means for the closest adjustment to the desired speed of the engine. Owing to our new and improved valve and the ease of tripping the hook, we are enabled to control the speed of the engine from full load to no load and *vice versa*, inside extremely small margin.

The close regulation of our engines especially adapts them for Electrical Purposes and for all duties where a practically constant speed is of greatest importance.

MATERIAL. All materials used in the construction of our engines are carefully selected to suit the various purposes for which they are used. Where we have found it advisable to use a higher grade of steel, as in piston rods, connecting rods, cross-head pins, crank pins, etc., we do so, but all bolts and studs are made of low carbon steel. Phosphor bronze is used wherever this metal has been found to serve a desirable purpose; and nothing but Genuine Babbitt Metal is used for facing journal boxes and cross-head shoes.

THE COOKSON IMPROVED FEED WATER HEATER, PURIFIER, FILTER AND OIL SEPARATOR.



Made in sizes from 50 to 4,500 Horse Power.

ADVANTAGES.

The Cookson Improved Combination Heater Over All Others.

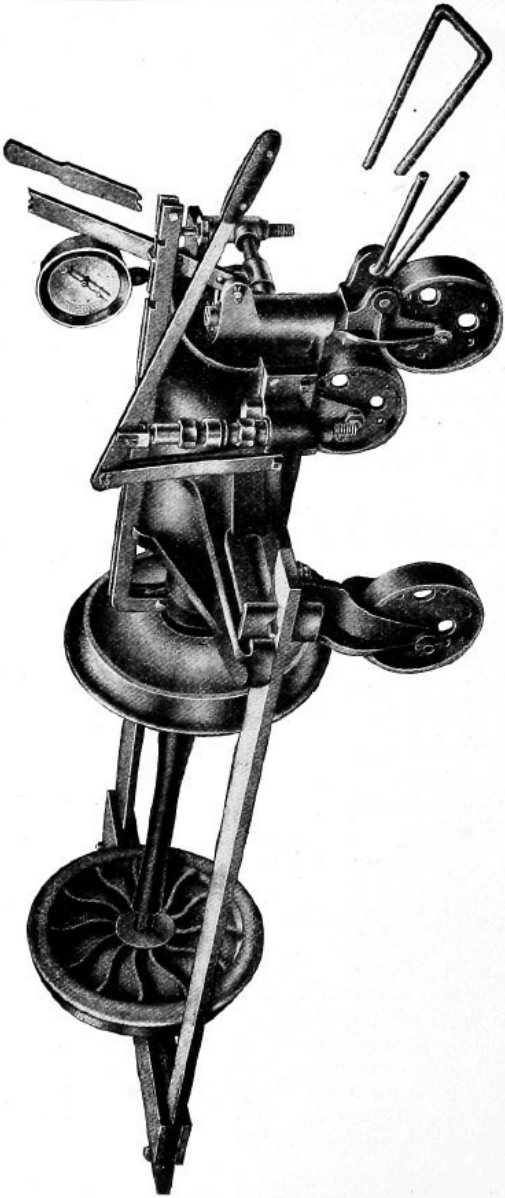
1—Higher temperature of Feed Water without back pressure on engines.
2—Will heat more water with less steam.
3—The steam only that is to be condensed comes in contact with the water.
4—The only Heater built that purifies the steam before passing to the heating system, and without chilling it by passing through a spray of water, as in all other heaters.
5—The only open Heater made, reversible in operation, making it Right or Left-handed, and suitable for any location.
6—The only Heater made separating the oil from the exhaust steam on entering the Heater from *either* exhaust opening, one an oil separator and the other a steam separator, and operating by the steam passing through it in either direction.
7—More lime-catching surface and filtering capacity than any other Heater.

A FEW POINTS WORTH REMEMBERING.

1—*Don't.* Don't let pressure Heater men tell you that you will always have trouble pumping hot water, as long as the pump manufacturer will guarantee you that you will not.
2—*Oil Separation.* Open Heaters generally are provided with oil separators that are more or less efficient, but for the proper separation of oil from steam, deflection and change of direction in the current of steam is necessary. If the other fellow has a good *one* we have a good *two.* All Cookson Heaters have two separators.
3—*Oil Discharge Pipe.* The best oil or steam separator on earth is no longer a separator if your oil discharge or drain is clogged up. See to it that this does not happen with you. Many a good thing is ruined by the handling.

NOTE.

Style A—Combination Heater, Purifier, Filter and Oil Separator for power plants.
Style B—Combination Heater, Purifier, Filter, Oil Separator and Condensation Receiver for heating systems.
Style C—Combination Heater, Purifier, Oil Separator and Condensation Receiver, with high and low water levels, for heating systems.
Style D—Combination Heater, Purifier, Oil Separator and Condensation Receiver, with high and low water level and pump governing attachment for heating systems.
In ordering or asking for quotations, please give us the following information:
1—Whether Style A, B, C or D is wanted.
2—Horse power capacity of your boilers.
3—Horse power capacity of your engine.
4—Size of exhaust pipe.



ZELNICKER HYDRAULIC PORTABLE 60 TON WHEEL PRESS.

The "ZELNICKER" PORTABLE HYDRAULIC WHEEL PRESS is now presented in a new and perfected shape.

It represents several years' experiments, and the design is such that a maximum result is obtained on a minimum of weight.

All surplus metal has been eliminated by theoretical calculation and practical trial, so that with a press weighing 1,250 lbs. we can guarantee just as satisfactory results on STANDARD CAR WHEELS as can be obtained with a $500.00 power press.

It is a very simple and substantial tool and a skilled mechanic is not required to operate it; all that is needed is water and a man to work the pump.

The press is tested before leaving the works to a total pressure of 75 tons and is fully guaranteed up to its rated capacity of 60 TONS (4,200 lbs. per square inch on 6 inch ram).

The ram is forced against the work by the upright lever and the pressure is obtained by working the pump.

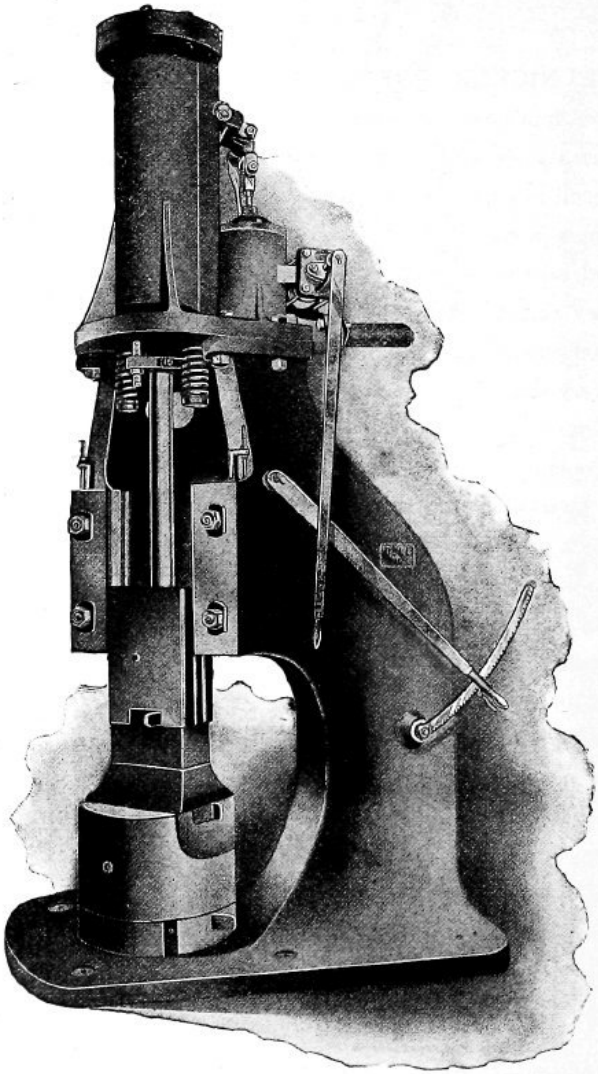
The pressure increases at the rate of 2 tons per stroke and the stroke can be easily made with one hand.

This machine will save its cost to a logging railroad in a very short time in the way of freight charges on old wheels and axles.

Price of the PRESS complete with gauge, crated for shipment, $200.00.

SIDE AND CROSS BARS are *not included* with the press, as they are ordinarily required of different sizes to suit various classes of work. They are merely flat steel bars slotted to take keys as shown in the illustration and can be readily turned out by your own blacksmith.

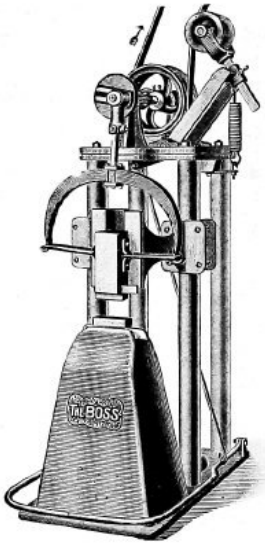
We can furnish them if desired, complete for standard gauge axles, $30.00.



1,000 LB. IMPROVED STEAM HAMMER.

BELL STEAM HAMMER.

	"REGULAR BELL"				"STANDARD GUIDE" IMPROVED					
	No. 1	No. 2	No. 3	No. 4						
Falling weights .....Lbs.	250	450	700	1500	300	500	850	1000	1250	1600
Diameter of Cylinder..... Ins.	6 in.	8 in.	10 in.	12 in.	5 in.	7 in.	8½ in.	10 in.	11¼ in.	12 in.
Length of stroke..... "	16 in	18 in.	22 in.	30 in.	18 in.	20 in.	24 in.	28 in.	32 in.	34 in.
Total weight .....Lbs	3800	5200	8200	18700	5800	8800	13000	18000	21200	28000
Usual die face.....Ins	3½ x7	4¼ x 8	5¼ x 10	7 x 14	4½x7¾	5x 10 ¾	6 x 13	6¾ x 13½	7½ x 14	8¼ x 15
Face of ram..... "	4¾ x 7	5¼ x 8	6¾ x 10	9 x 14	5½x8¼	7 x 11	8 x 13¾	8 x 14	8½ x 14½	9 x 15¼
Distance between slides ..... "	.....	.....	.....	.....	8¼	11	13¾	14	14½	15¼
Center die to frame..... "	11½	15	16½	18	14	18	21	22½	24	26
Total height.....	7′ 2"	8′ 6"	9′ 8"	12′ 0"	8′ 2"	9′ 1	10′ 4"	11′ 4"	12′ 2"	13′ 10"
Diameter steampipe..... Ins.	1½	1½	2	2½	1½	1½	2	2½	2½	2½
" exhaust pipe..... "	2	2	2½	3	2	2	2½	3	3	3
Bedplate..... Length	3′ 6"	3′ 11"	4′ 9½"	6′ 1"	3′ 11"	4′ 7½"	5′ 3"	5′ 9"	6′ 3"	6′ 9"
Bedplate..... Width	2′ 3"	2′ 8½	3′ 1½"	4′ 3"	2′ 6"	2′ 10"	3′ 4"	3′ 7"	3′ 10"	4′ 2"
Price..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Additional cost foot treadle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" " steel dies.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shipment after receipt order..										



POWER HAMMER.

The Boss Power Hammer is a useful machine in general repair and blacksmith shops, wagon and buggy factories, coal mines, gold mines, shovel factories, etc.

Estimated force of blow at full speed 300 lbs., or it will strike a blow light enough to crack an egg without crushing it.

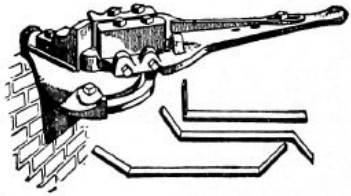
Floor space 24x44 inches, height 6 feet 5 inches, distance between columns 11¾ inches.

Size of drive pulley on crank shaft 10 inch diameter, 4 inch face, speed 375 per minute.

Weight of hammer head and die, 45 lbs.; weight of machine complete with anvil and dies, 1,200 lbs.; knocked down and boxed for export, 1,600 lbs. gross, 1,150 lbs. net. Occupies 35 cubic feet.

Price.....$130 00

ANGLE BENDER.



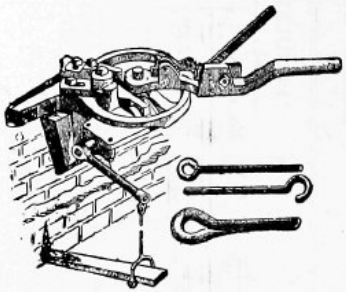
No. 1. Bends flat stock up to 2 inches wide by ⅜ inch thick, and round or square stock up to ¾ inch. Bends ⅜x1 inch and under edgewise.

Price, with one set of dies.....$18 00

No. 2. Bends flat stock up to 4 inches wide by ½ inch thick, and round or square stock up to 1 inch. Bends ⅜x1½ inch stock, and under, edgewise.

Price, with two full sets of dies....$30 00

EYE BENDER.



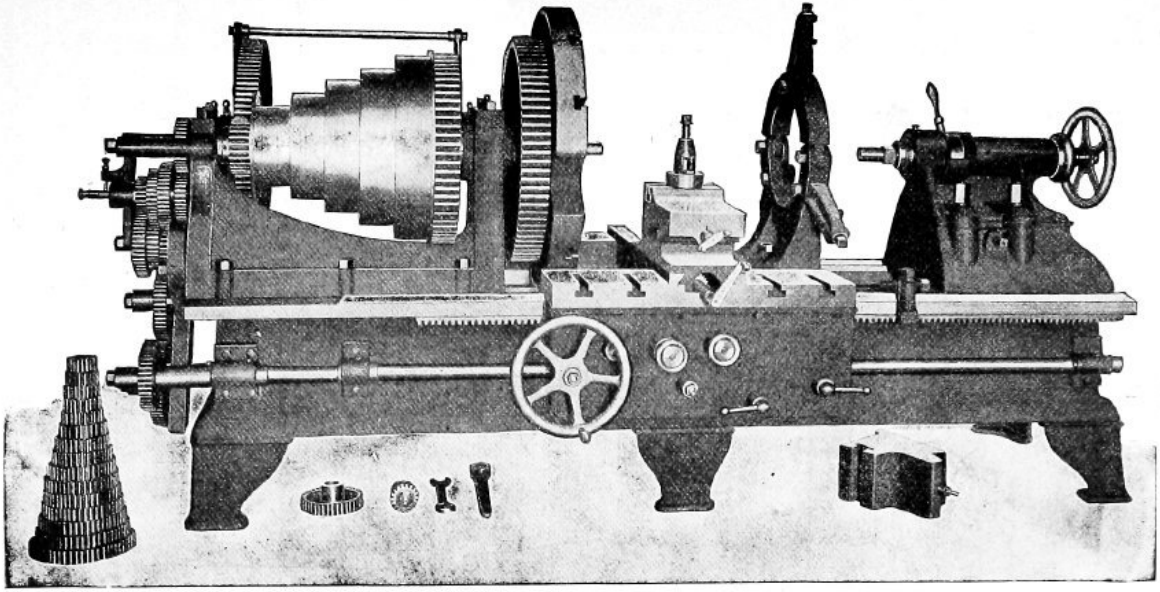
No. 1. Takes stock up to and including ½ inch. Bends rings and eyes up to 2¾ inches outside diameter.

Price.....$20 00

No. 2. Takes stock up to and including ¾ inch. Bends rings and eyes up to 3 inches outside diameter.

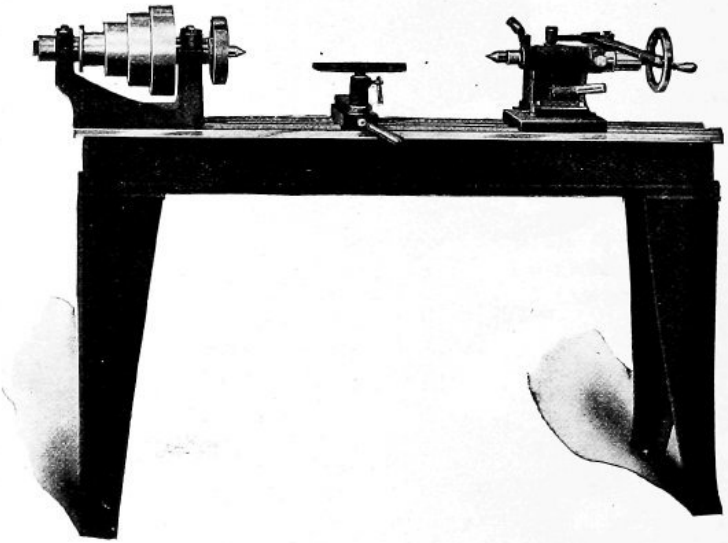
Price.....$25 00

THIRTY-SIX INCH LATHE.



Write us for prices on Lathes of all sizes and styles, Planers, Shapers and Milling Machines.

SPEED LATHES.



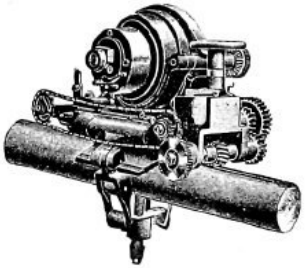
DIMENSIONS AND PRICES.

	BENCH.		LONG LEGS.											
Distance between centers, inches	15	27	15	27	39	51	36	48	72	96	42	66	90	114
Length of bed, feet	3	4	3	4	5	6	5	6	8	10	6	8	10	12
Swing, inches	11	11	11	11	11	11	13	13	13	13	16	16	16	16
Speed of counter-shaft about	350	350	350	350	350	350	250	250	250	250	225	225	225	225
Net weight, lbs	210	235	310	335	365	405	510	550	640	800	860	860	1,050	1,150
Price, with counter-shaft	$42 50	45 00	47 50	50 00	52 50	55 00	62 00	65 00	77 50	90 00	87 50	100 00	112 50	125 00

We furnish these Lathes with Beds of any desired length.

Continuous Key-Way or Spline Cutter

will cut any size keyway from ½ in. to 3 in wide, any depth not exceeding 1 in., and will take any size shaft from 6 in. to 16 in. in diameter.



ready for use with electric motor or flexible shaft and full set cutters, boxed, Price complete, $400.00 net. Weight, net 170 lbs.; boxed 210 lbs. Price with rope or belt drive, $350.00, Weight, net 135 lbs.; boxed 175 lbs. Measurement, 16 in. x 16 in. x 30 in.

COMBINATION MACHINE.

THIS ILLUSTRATION shows a combination of two very valuable labor saving machines, a PORTABLE KEY-SEATER in combination with a CONTINUOUS KEY-WAY or SPLINE CUTTER.

The advantages of this machine will be apparent to engineers, machine tool builders, millwrights, manufacturers and all others using shafting.

As a CONTINUOUS KEY-WAY or SPLINE CUTTER it will mill accurately and in perfect alignment, any size key-way or spline, from ¼ in. by sixteenths to 1½ in., and from 1½ in. by eighths to 2 in., any depth not exceeding ⅜ in., *at the rate of one inch per minute*, any length required, and take any size shaft from ¾ in to 6 in. in diameter

To use it as a PORTABLE KEY-SEATER, disconnect two bolts from the stand of the Continuous Key-Way Cutter and apply Yoke and Crank and you have a No. 2 PORTABLE KEY-SEATER, that will mill any size shafting from 2 in. to 8 in. in diameter the following widths, viz.: From ¼ in. by sixteenths to 1½ in., and from 1½ in. by eighths to 2 in., any depth not exceeding ⅜ in.,

Portable Key-Seating Machines

In all sizes, to be operated either by hand, electric motor, flexible shaft or pulley.

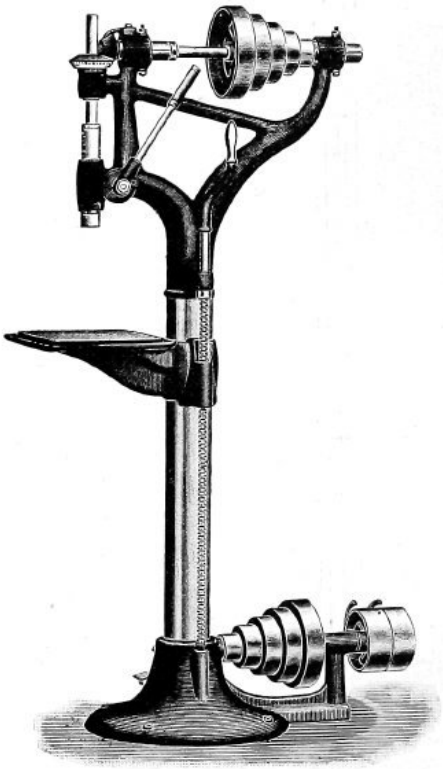
No. 1 machine will mill key-seats in any size shafting from ¾ to 4¾ inches in diameter the following widths, ¼ inch (by sixteenths) to and including 1½ inches,
Price Complete with full set cutters, boxed F. O. B. **$40.00** Net
Weight, net, 45 lbs.; boxed, 70 lbs.; measurements, 12 in. x 12 in. x 22 in

No. 1½ machine, while it is designed especially for cutting key-seats in loom and other machine shafts, where the shafting extends 3 or more inches through bearings, it will do all that the No. 1 machine will, besides it will cut key-way to within 1 inch of the face of box,
Price Complete, with full set cutters, boxed F. O. B. **$50.00** Net
Weight, net, 65 lbs.; boxed, 90 lbs.; measurements, 12 in. x 12 in. x 22 in

No. 2 machine will mill key-seats in any size shafting from 2 inches to 8 inches in diameter the following widths, from ¼ inch (by sixteenths) to 1½ inches and 1½ inches (by eighths) to 2 inches,
Price Complete with full set cutters, boxed F. O. B. **$60.00** Net.
Weight, net, 86 lbs.; boxed, 113 lbs.; measurements, 12 in. x 13 in. x 24 in.

* By adding $5.00 to the price of these machines, will furnish a pulley attachment, whereby they can be driven by belt power as well as by hand.

14 INCH BELT-DRIVEN DRILL.



This Drill is the most convenient and durable tool to be found anywhere. The adjustable boxes enable the user to always keep the cones in line and thereby save belts, which means time and money. The handle is a very ingenious device and is pronounced by authorities on the subject to be the best handle on any Drill to-day.

Price.....$

DIMENSIONS.

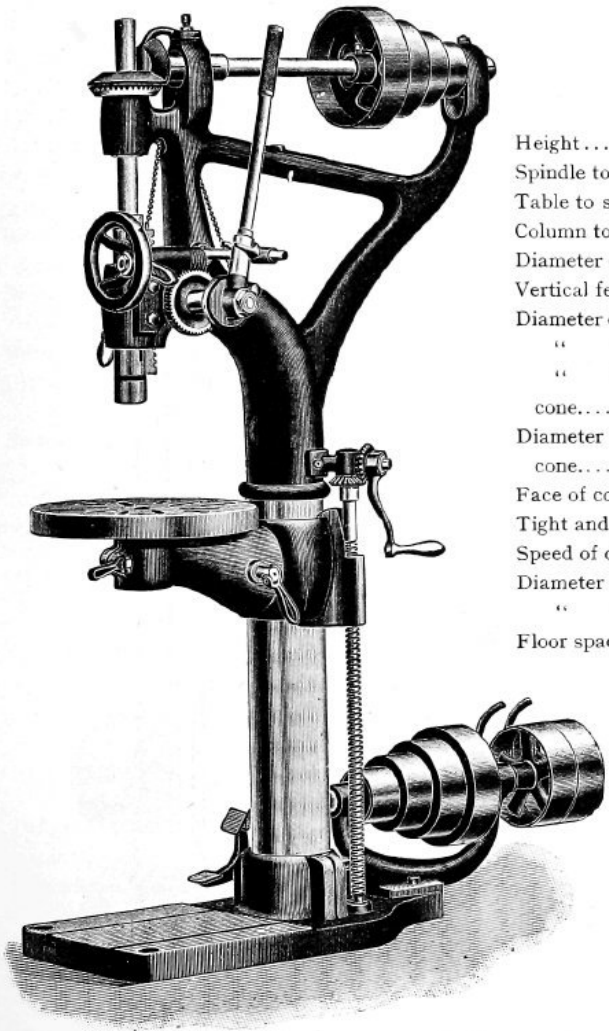
	INCHES.
Greatest height of Drill	65
" distance from table to spindle	32
Distance from column to center of spindle	7⅛
Diameter of column	4
Vertical feed of spindle	5½
Diameter of spindle	1
" " sleeve	1 1/16

Spindle fitted to No. 2 Morse taper.

	INCHES.
Diameter of table	10x12
" " largest pulley on cone	8
" " smallest " " "	2½
Face of cone pulley	1⅝
Tight and loose pulley	5¼ x2¼
Speed of driving "	300 rev.
Diameter of large gear	3 1/16
" " small "	2 1/16
Floor space	25x17

Weight, 250 lbs.

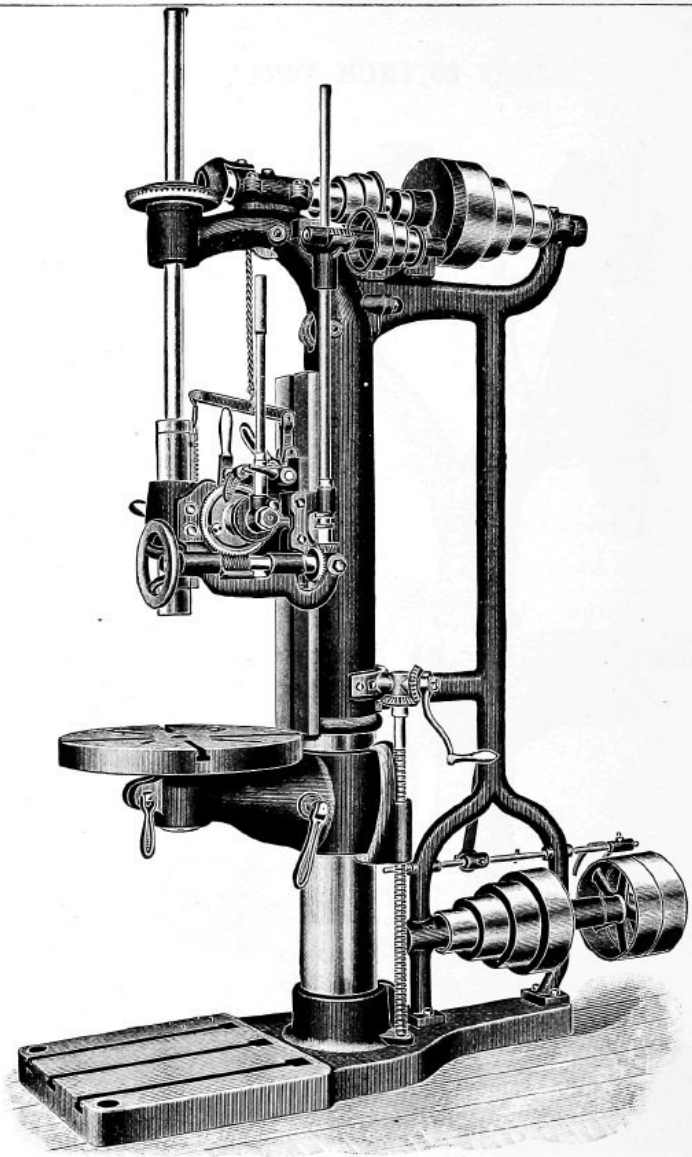
20 INCH DRILL.



Square Base, Wheel and Lever Feed.

	INCHES.
Height	68
Spindle to base	41
Table to spindle	27½
Column to center of spindle	10½
Diameter of column	5⅝
Vertical feed of spindle	9⅝
Diameter of spindle	1⅜
" " table	16
" " largest pulley on cone	9
Diameter of smallest pulley on cone	4
Face of cone pulley	2½
Tight and loose pulley	8x2¾
Speed of driving pulley	25
Diameter of large gear	5⅛
" " pinion	3⅜
Floor space	15x48

Weight, 600 lbs.



24 AND 26 INCH UPRIGHT SLIDINGHEAD DRILLS.

24 INCH UPRIGHT SLIDINGHEAD DRILL.

DIMENSIONS.

	INCHES.
Greatest height of Drill	83
" distance from spindle to base	50
Minimum distance	19
Greatest " from table to spindle	37
Distance from column to center of spindle	12⅜
Diameter of column	6⅝
Vertical feed of spindle	10⅜
Movement of slidinghead	20½
Diameter of spindle at top	1½
" " " in sleeve	1⅝

Spindle fitted for Morse No. 4 taper.

	INCHES.
Diameter of table	20
" " largest pulley on cone	11
" " smallest " " "	4
Face of cone pulley	3
Tight and loose pulley	10x3
Speed of driving "	180 rev.
Diameter of largest gear	8
" " pinion	3⅝
Floor space	20x64
Size of base surface	21x20
Weight, net	1,350 lbs.
" crated	1,440 "

Prices quoted on application.

26 INCH UPRIGHT SLIDINGHEAD DRILL.

DIMENSIONS.

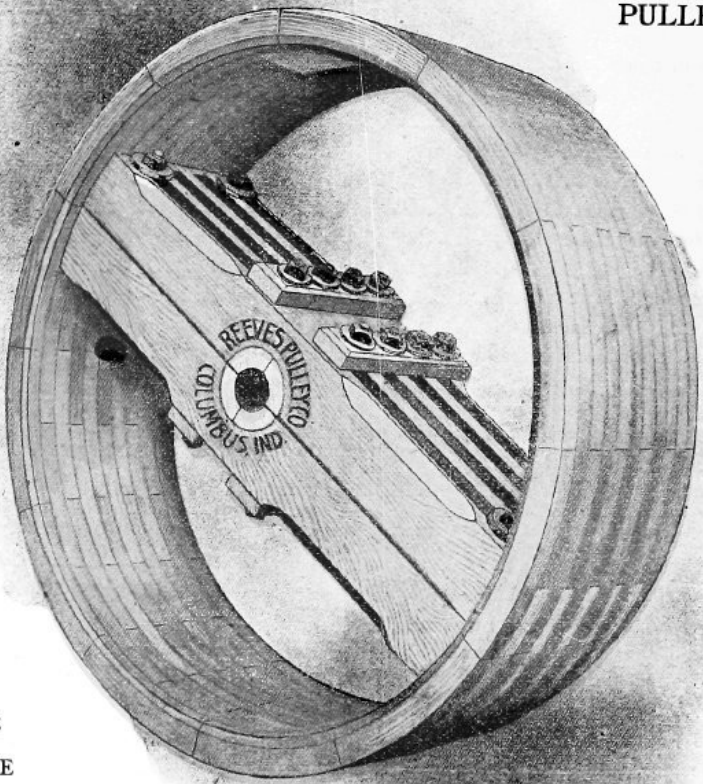
	INCHES.
Greatest height of Drill	85
" distance from spindle to base	50
Minimum distance	17
Greatest " from table to spindle	37
Distance from column to center of spindle	13 3/16
Diameter of column	7¼
Vertical feed of spindle	11½
Movement of slidinghead	23
Diameter of spindle at top	1⅝
" " " in sleeve	1¾

Spindle fitted for Morse No. 4 taper.

	INCHES.
Diameter of table	22
" " largest pulley on cone	11
" " smallest " " "	4
Face of cone pulley	3
Tight and loose pulley	10x3
Speed of driving "	180 rev.
Diameter of largest gear	8
" " pinion	3⅝
Floor space	21½x68
Size of base surface	21¾x22
Weight, net	1,410 lbs.
" crated	1,500 "

Prices quoted on application.

REEVES'
WOOD
SPLIT
PULLEYS.



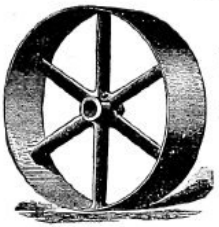
WE
ARE
THE
SELLING
AGENTS.

WOOD-SPLIT PULLEY PRICE LIST.

	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	
3	$1 90	$2 00	$2 10	$2 25	$2 40	$2 60	$2 85	$3 10	$3 60	$4 10	$4 75					3
4	2 00	2 10	2 20	2 40	2 60	2 85	3 10	3 35	3 85	4 40	5 10					4
5	2 10	2 20	2 40	2 60	2 85	3 10	3 35	3 60	4 10	4 75	5 45					5
6	2 20	2 35	2 55	2 75	3 00	3 25	3 50	3 75	4 30	5 00	5 70					6
7	2 30	2 45	2 65	2 85	3 10	3 35	3 60	3 85	4 50	5 20	5 90					7
8	2 45	2 60	2 80	3 00	3 25	3 50	3 75	4 00	4 65	5 40	6 20					8
9	2 60	2 80	3 00	3 25	3 50	3 75	4 00	4 30	5 00	5 80	6 60					9
10	2 80	3 00	3 25	3 50	3 75	4 00	4 30	4 65	5 40	6 20	7 00					10
11	3 00	3 25	3 50	3 75	4 00	4 30	4 65	5 00	5 80	6 60	7 50					11
12	3 15	3 40	3 65	3 90	4 20	4 55	4 90	5 30	6 10	6 90	7 90					12
13	3 30	3 55	3 80	4 10	4 45	4 80	5 20	5 60	6 40	7 30	8 40					13
14	3 45	3 70	4 00	4 35	4 70	5 10	5 55	6 00	6 90	7 90	9 10					14
15	3 60	3 90	4 25	4 60	5 00	5 45	5 90	6 35	7 30	8 40	9 60					15
16	3 80	4 15	4 50	5 00	5 50	6 00	6 50	7 00	8 00	9 00	10 30					16
17	4 00	4 40	4 90	5 40	5 90	6 40	6 90	7 40	8 40	9 50	11 00					17
18	4 20	4 70	5 20	5 70	6 20	6 70	7 20	7 80	9 00	10 30	11 90					18
19	4 40	4 90	5 40	5 90	6 50	7 10	7 70	8 30	9 50	11 00	12 60					19
20	4 60	5 20	5 80	6 40	7 00	7 60	8 30	9 00	10 40	12 00	13 80	$15 60	$17 50	$19 60	$21 80	20
21	4 80	5 40	6 00	6 60	7 30	8 00	8 70	9 40	11 00	12 70	14 50	16 50	18 60	20 80	23 20	21
22	5 00	5 60	6 30	7 00	7 70	8 40	9 20	10 00	11 70	13 50	15 50	17 70	20 00	22 40	24 80	22
23	5 20	5 80	6 50	7 20	8 00	8 80	9 70	10 60	12 50	14 70	17 00	19 40	21 80	24 30	26 90	23
24	5 50	6 20	7 00	7 80	8 60	9 40	10 30	11 20	13 00	15 30	17 70	20 20	22 80	25 40	28 20	24
25	5 90	6 60	7 30	8 10	9 00	10 00	11 00	12 00	14 00	16 40	19 00	21 80	24 60	27 50	30 50	25
26	6 20	7 00	7 80	8 60	9 50	10 50	11 50	12 60	15 00	17 60	20 40	23 30	26 30	29 50	32 70	26
27	6 60	7 40	8 20	9 00	10 00	11 10	12 20	13 40	15 80	18 50	21 50	24 50	27 70	30 90	34 10	27
28	7 00	7 80	8 60	9 50	10 50	11 60	12 80	14 60	16 50	19 40	22 40	25 60	28 80	32 00	35 30	28
29	7 30	8 20	9 10	10 00	11 10	12 30	13 50	14 75	17 50	20 50	23 70	27 00	30 40	33 80	37 20	29
30	7 70	8 60	9 50	10 60	11 80	13 00	14 30	15 60	18 50	21 50	25 00	28 50	32 00	35 50	39 00	30
31	8 00	9 00	10 00	11 10	12 35	13 60	15 00	16 50	19 60	22 80	26 40	30 00	33 80	37 20	40 80	31
32	8 50	9 50	10 50	11 60	12 85	14 10	15 50	17 00	20 30	23 80	27 40	31 00	35 00	39 00	43 00	32
33	9 00	10 00	11 15	12 35	13 65	15 00	16 45	18 00	21 40	24 95	28 60	32 30	36 40	40 60	44 90	33
34	9 40	10 60	11 80	13 10	14 45	15 90	17 40	19 00	22 50	26 10	29 80	33 60	37 80	42 20	46 80	34
35	9 85	11 15	12 45	13 85	15 25	16 80	18 35	20 00	23 50	27 20	31 00	34 90	39 20	43 80	48 70	35
36	10 30	11 70	13 10	14 60	16 10	17 70	19 30	21 00	24 00	28 00	32 00	36 00	40 00	45 00	50 00	36
38		12 80	14 40	16 00	17 70	19 50	21 20	23 00	26 00	30 00	34 00	38 00	43 00	48 00	54 00	38
40		13 90	15 70	17 50	19 30	21 25	23 10	25 00	28 00	32 00	36 00	41 00	46 00	51 00	58 00	40
42		15 00	17 00	19 00	21 00	23 00	25 00	27 00	31 00	35 00	39 00	44 00	49 00	55 00	62 00	42
44		17 00	19 00	21 00	23 00	25 00	27 00	29 00	33 00	37 00	42 00	47 00	53 00	60 00	67 00	44
46		19 00	21 00	23 00	25 00	27 00	29 00	31 00	36 00	40 00	45 00	51 00	57 00	65 00	73 00	46
48		21 00	23 00	25 00	27 00	29 00	31 50	33 90	38 50	43 00	48 00	54 00	61 00	70 00	78 00	48
50			25 00	27 00	29 00	31 00	33 70	36 20	41 00	46 00	51 00	58 00	65 00	75 00	84 00	50
52			28 00	30 00	32 00	34 00	36 00	38 50	43 50	49 00	55 00	62 00	70 00	80 00	90 00	52
54			30 00	32 00	34 00	36 00	38 50	41 20	6 00	52 00	59 00	66 00	75 00	85 00	95 00	54
56				35 00	37 00	39 00	41 00	43 00	49 00	55 00	63 00	71 00	80 00	90 00	101 00	56
58				38 00	40 00	42 00	44 00	46 00	52 00	59 00	67 00	75 00	85 00	95 00	106 00	58
60				41.00	43 00	45 00	47 00	49 00	55 00	62 00	71 00	80 00	90 00	100 00	112 00	60
62				44 00	46 00	48 00	50 00	52 00	58 00	66 00	75 00	85 00	95 00	106 00	118 00	62
64				46 00	48 00	50 00	52 00	55 00	61 00	69 00	79 00	89 00	99 00	110 00	123 00	64
66				48 00	50 00	52 00	54 00	57 00	64 00	73 00	83 00	93 00	103 00	115 00	129 00	66
68				50 00	52 00	54 00	56 00	60 00	68 00	77 00	87 00	97 00	108 00	120 00	134 00	68
70				52 00	54 00	56 00	59 00	63 00	71 00	81 00	91 00	101 00	112 00	125 00	140 00	70
72				54 00	56 00	58 00	62 00	66 00	75 00	85 00	95 00	105 00	117 00	130 00	146 00	72
74				58 00	60 00	62 00	66 00	70 00	80 00	90 00	100 00	110 00	122 00	135 00	152 00	74
76				62 00	64 00	66 00	71 00	75 00	85 00	95 00	105 00	116 00	128 00	141 00	158 00	76
78						71 00	75 00	80 00	90 00	100 00	110 00	121 00	133 00	147 00	164 00	78
80						75 00	80 00	85 00	95 00	105 00	115 00	127 00	139 00	153 00	170 00	80
82						80 00	85 00	90 00	100 00	110 00	121 00	133 00	145 00	159 00	176 00	82
84						85 00	90 00	96 00	107 00	118 00	130 00	143 00	156 00	170 00	188 00	84
86						90 00	96 00	102 00	114 00	126 00	139 00	153 00	167 00	182 00	200 00	86
88						95 00	101 00	108 00	121 00	134 00	148 00	163 00	178 00	194 00	212 00	88
90						100 00	107 00	114 00	128 00	142 00	157 00	173 00	189 00	206 00	225 00	90
92						105 00	112 00	120 00	135 00	150 00	166 00	183 00	200 00	218 00	237 00	92
94						110 00	118 00	126 00	142 00	158 00	175 00	193 00	211 00	229 00	249 00	94
96						115 00	123 00	132 00	149 00	166 00	184 00	203 00	222 00	241 00	262 00	96
98						120 00	129 00	138 00	156 00	174 00	193 00	213 00	233 00	253 00	274 00	98
100						125 00	134 00	144 00	163 00	182 00	202 00	223 00	244 00	265 00	286 00	100

CAST IRON PULLEYS.

Bored, Turned and Balanced, and with Key Seat or Set Screws.



When ordering pulleys, be careful to give the following particulars: Diameter and face and bore of pulley; if crown or straight face is required; whether key seated or set screwed or both; whether for single or double belt.

When orders are received for pulleys and no description given, crown face will be sent.

Extra charge is made when pulleys are both key seated and set screwed.

For non-shifting belts, pulleys should have crown faces.

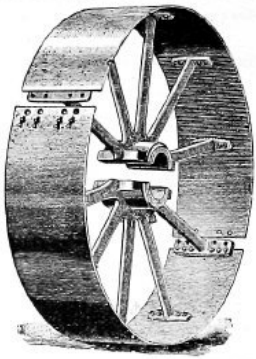
For shifting belts, the driving pulleys should have straight faces.

Tight and loose pulleys should have crown faces.

Diameter.	Face.	PRICE. Single Belt.	Double Belt.
3	3	$1 35	$1 45
	4	1 50	1 60
	5	1 70	1 80
	6	1 95	2 05
4	3	1 45	1 55
	4	1 65	1 75
	5	1 85	2 00
	6	2 10	2 25
5	3	1 55	1 65
	4	1 80	1 95
	5	2 15	2 30
	6	2 50	2 65
6	3	1 65	1 75
	4	1 95	2 10
	5	2 30	2 45
	6	2 65	2 80
	7	3 00	3 15
	8	3 35	3 55
7	3	1 75	1 90
	4	2 15	2 30
	5	2 50	2 70
	6	2 85	3 10
	7	3 20	3 50
	8	3 55	3 90
8	3	1 85	2 00
	4	2 25	2 40
	5	2 65	2 80
	6	3 00	3 20
	7	3 35	3 60
	8	3 70	4 00
9	3	2 00	2 20
	4	2 40	2 60
	5	2 80	3 00
	6	3 15	3 40
	7	3 50	3 80
	8	3 85	4 20
10	3	2 15	2 30
	4	2 55	2 75
	5	2 95	3 15
	6	3 30	3 60
	7	3 65	4 00
	8	4 00	4 40
	9	4 45	4 85
	10	4 90	5 30
11	3	2 25	2 40
	4	2 65	2 80
	5	3 05	3 25
	6	3 45	3 75
	7	3 85	4 25
	8	4 30	4 80
	9	4 75	5 30
	10	5 25	5 80
12	3	2 40	2 55
	4	2 80	2 95
	5	3 20	3 35
	6	3 60	3 85
	7	4 00	4 35
	8	4 45	4 90
	9	4 90	5 40
	10	5 40	5 90
	11	5 90	6 40
	12	6 40	6 90
13	3	2 55	2 70
	4	2 95	3 10
	5	3 35	3 50
	6	3 75	4 00
	7	4 15	4 50
	8	4 60	5 00
	9	5 05	5 50
	10	5 60	6 15
	11	6 15	6 70
	12	6 70	7 30
14	3	2 70	2 90
	4	3 10	3 30
	5	3 50	3 75
	6	4 00	4 25
	7	4 50	4 85
	8	5 05	5 50
	9	5 60	6 10
	10	6 15	6 70
	11	6 70	7 35
	12	7 25	7 90
	14	8 35	9 00
15	3	2 90	3 10
	4	3 30	3 55
	5	3 75	4 05
	6	4 25	4 65
	7	4 80	5 25
	8	5 35	5 85
	9	5 90	6 45
15	10	6 45	7 10
	11	7 05	7 75
	12	7 65	8 40
	14	9 10	10 00
16	3	3 05	3 35
	4	3 55	3 85
	5	4 05	4 40
	6	4 60	5 00
	7	5 15	5 70
	8	5 80	6 40
	9	6 40	7 10
	10	7 00	7 80
	11	7·60	8 50
	12	8 20	9 20
	14	9 80	10 90
	16	11 40	12 50
17	3	3 25	3 55
	4	3 75	4 05
	5	4 25	4 75
	6	4 85	5 45
	7	5 50	6 15
	8	6 15	6 75
	9	6 80	7 45
	10	7 45	8 15
	11	8 10	8 90
	12	8 80	9 65
	14	10 50	11 50
	16	12 10	13 40
18	3	$3 45	$3 80
	4	4 00	4 35
	5	4 55	5 00
	6	5 15	5 70
	7	5 85	6 45
	8	6 55	7 20
	9	7 20	7 95
	10	7 85	8 70
	11	8 50	9 45
	12	9 30	10 25
	14	11 15	12 25
	16	12 85	14 30
19	3	3 65	4 05
	4	4 20	4 60
	5	4 80	5 30
	6	5 50	6 00
	7	6 20	6 75
	8	6 90	7 50
	9	7 55	8 25
19	10	8 25	9 00
	11	9 00	9 90
	12	9 80	10 80
	14	11 80	12 95
	16	13 80	15 10
	18	15 80	17 25
20	3	3 85	4 25
	4	4 40	4 80
	5	5 00	5 50
	6	5 70	6 20
	7	6 40	6 95
	8	7 10	7 70
	9	7 80	8 55
	10	8 65	9 50
	11	9 50	10 45
	12	10 35	11 50
	14	12 35	13 65
	16	14 40	15 85
	18	16 50	18 15
21	3	4 05	4 45
	4	4 60	5 00
	5	5 30	5 75
	6	6 00	6 55
	7	6 75	7 35
	8	7 55	8 30
	9	8 35	9 20
	10	9 20	10 15
	11	10 05	11 15
	12	10 90	12 15
	14	13 10	14 55
	16	15 20	16 95
	18	17 30	19 35
22	3	4 25	4 70
	4	4 80	5 25
	5	5 55	6 10
	6	6 30	7 00
	7	7 15	7 95
	8	8 10	8 95
	9	9 00	9 90
	10	9 90	10 90
	11	10 75	11 90
	12	11 65	12 90
	14	13 90	15 35
	16	16 00	17 80
	18	18 20	20 30
23	3	4 45	4 95
	4	5 05	5 60
23	5	5 85	6 45
	6	6 70	7 35
	7	7 55	8 40
	8	8 50	9 45
	9	9 40	10 30
	10	10 35	11 55
	11	11 30	12 60
	12	12 30	13 65
	14	14 60	16 25
	16	17 00	18 90
	18	19 40	21 55
24	3	4 80	5 30
	4	5 45	6 05
	5	6 30	6 90
	6	7 05	7 75
	7	7 90	8 65
	8	8 85	9 75
	9	9 80	10 85
	10	10 80	11 95
	11	11 80	13 05
	12	12 90	14 30
	14	15 40	17 10
	16	17 90	19 90
	18	20 40	22 75
	20	23 20	25 90
25	3	5 00	5 55
	4	5 70	6 35
	5	6 55	7 25
	6	7 35	8 15
	7	8 25	9 05
	8	9 20	10 15
	9	10 30	11 40
	10	11 40	12 45
	11	12 50	13 80
	12	13 65	15 05
	14	16 20	17 95
	16	18 80	20 90
	18	21 40	23 90
	20	24 30	27 15
26	3	5 25	5 80
	4	5 95	6 65
	5	6 85	7 60
	6	7 70	8 55
	7	8 60	9 60
	8	9 60	10 70
	9	10 80	11 95
	10	12 00	13 25
	11	13 20	14 55

CAST IRON WHOLE PULLEYS—Continued

Diameter.	Face.	PRICE. Single Belt.	Double Belt.
26	12	14 40	15 85
	14	17 00	18 80
	16	19 70	21 90
	18	22 40	25 10
	20	25 40	28 40
27	3	5 45	6 00
	4	6 25	6 90
	5	7 15	7 90
	6	8 05	8 95
	7	9 00	10 05
	8	10 05	11 25
	9	11 25	12 50
	10	12 45	13 85
	11	13 70	15 15
	12	15 00	16 55
	14	17 80	19 75
	16	20 65	23 00
	18	23 50	26 35
	20	26 50	29 75
28	3	5 70	6 25
	4	6 55	7 15
	5	7 50	8 25
	6	8 45	9 35
	7	9 45	10 50
	8	10 55	11 80
	9	11 75	13 10
	10	12 95	14 45
	11	14 20	15 80
	12	15 60	17 25
	14	18 60	20 70
	16	21 60	24 15
	18	24 60	27 60
	20	27 60	31 10
29	3	5 95	6 45
	4	6 80	7 45
	5	7 80	8 60
	6	8 80	9 65
	7	9 85	10 90
	8	11 00	12 30
	9	12 25	13 65
	10	13 50	15 05
	11	14 75	16 45
	12	16 15	18 05
	14	19 30	21 60
	16	22 45	25 20
	18	25 60	28 70
	20	28 75	32 25
30	3	6 20	6 70
	4	7 10	7 80
	5	8 10	8 95
	6	9 15	10 10
	7	10 25	11 45
	8	11 45	12 85
	9	12 75	14 25
	10	14 05	15 70
	11	15 35	17 15
	12	16 75	18 90
	14	20 00	22 50
	16	23 30	26 20
	18	26 60	29 80
	20	29 90	33 40
31	3	6 40	6 90
	4	7 30	8 00
31	5	$8 30	$9 15
	6	9 35	10 30
	7	10 45	11 65
	8	11 65	13 05
	9	12 95	14 45
	10	14 25	15 90
	11	15 55	17 35
	12	16 95	19 10
	14	20 20	22 70
	16	23 55	26 45
	18	26 95	30 05
	20	30 35	33 70
32	3	6 55	7 10
	4	7 45	8 20
	5	8 45	9 35
	6	9 55	10 50
	7	10 65	11 85
	8	11 85	13 25
	9	13 15	14 65
	10	14 45	16 10
	11	15 75	17 55
	12	17 15	19 30
	14	20 40	22 90
	16	23 80	26 70
	18	27 30	30 30
	20	30 80	34 00
33	3	6 75	7 30
	4	7 65	8 40
	5	8 65	9 55
	6	9 75	10 75
	7	10 90	12 10
	8	12 15	13 55
	9	13 50	15 05
	10	14 80	16 55
	11	16 10	18 10
	12	17 65	19 80
	14	21 05	23 55
	16	24 50	27 40
	18	28 00	31 20
	20	31 55	35 05
34	3	6 95	7 50
	4	7 85	8 60
	5	8 85	9 75
	6	9 95	11 00
	7	11 20	12 40
	8	12 50	13 90
	9	13 85	15 45
	10	15 20	17 00
	11	16 50	18 60
	12	18 20	20 30
	14	21 70	24 20
	16	25 20	28 10
	18	28 70	32 10
	20	32 30	36 10
35	3	7 15	7 70
	4	8 05	8 85
	5	9 10	10 05
	6	10 30	11 43
	7	11 65	12 95
	8	13 00	14 50
	9	14 35	16 05
	10	15 80	17 65
35	11	17 30	19 30
	12	18 65	21 15
	14	22 05	25 15
	16	26 20	29 15
	18	29 80	33 20
	20	33 45	37 25
36	3	7 35	7 90
	4	8 30	9 10
	5	9 40	10 40
	6	10 70	11 90
	7	12 10	13 50
	8	13 50	15 10
	9	14 90	16 70
	10	16 40	18 30
	11	18 10	20 00
	12	20 10	22 00
	14	23 60	26 10
	16	27 20	30 20
	18	30 90	34 30
	20	34 00	38 40
38	3	7 75	8 30
	4	8 80	9 65
	5	10 10	11 15
	6	11 50	12 70
	7	13 00	14 30
	8	14 50	15 95
	9	16 00	17 60
	10	17 50	19 30
	11	19 20	21 10
	12	21 20	23 20
	14	24 80	27 60
	16	28 70	32 30
	18	32 80	37 00
	20	37 00	41 50
40	3	8 15	8 80
	4	9 25	10 20
	5	10 75	11 85
	6	12 25	13 50
	7	13 75	15 20
	8	15 25	16 90
	9	16 75	18 60
	10	18 60	20 50
	11	20 30	22 40
	12	22 40	24 60
	14	26 40	29 20
	16	30 90	34 20
	18	35 40	39 30
	20	40 00	44 50
42	3	8 55	9 30
	4	9 80	10 80
	5	11 30	12 45
	6	12 85	14 20
	7	14 40	16 00
	8	16 05	17 90
	9	17 70	19 85
	10	19 55	21 85
	11	21 25	23 85
	12	23 35	26 00
	14	27 50	31 20
	16	32 50	36 40
	18	37 50	41 80
	20	42 50	47 30
44	3	8 95	9 80
	4	10 35	11 40
	5	11 90	13 15
	6	13 50	15 00
	7	15 30	17 00
	8	17 10	19 00
	9	18 90	21 00
	10	20 75	23 00
	11	$22 50	25 00
	12	24 60	27 20
	14	29 30	33 00
	16	34 50	38 80
	18	39 80	44 80
	20	45 40	51 00
46	3	9 40	10 30
	4	10 95	12 05
	5	12 60	13 85
	6	14 30	15 75
	7	16 10	17 80
	8	17 95	19 90
	9	19 75	22 00
	10	21 60	24 10
	11	23 50	26 20
	12	25 60	28 40
	14	30 90	34 60
	16	36 50	40 80
	18	42 20	47 10
	20	48 10	53 70
48	3	9 85	10 80
	4	11 50	12 70
	5	13 30	14 70
	6	15 10	16 75
	7	16 90	18 85
	8	18 80	21 00
	9	20 70	23 20
	10	22 60	25 45
	11	24 60	27 75
	12	26 70	30 15
	14	32 50	36 40
	16	38 60	43 20
	18	44 80	50 20
	20	52 00	58 10
50	6	18 30	20 00
	7	19 60	21 70
	8	21 90	24 00
	9	22 60	26 30
	10	24 30	28 60
	11	26 15	30 90
	12	28 05	33 20
	14	34 75	41 00
	16	41 40	48 80
	18	48 10	56 80
	20	55 00	64 80
	22	62 00	72 80
	24	69 00	80 80
52	6	19 60	22 00
	7	21 60	24 10
	8	23 80	26 50
	9	24 90	28 90
	10	26 75	31 30
	11	28 85	33 70
52	12	30 95	36 10
	14	38 00	44 20
	16	45 10	52 40
	18	52 20	60 60
	20	59 40	68 90
	22	66 75	77 30
	24	74 10	85 90
54	6	21 30	24 00
	7	23 50	26 20
	8	26 00	28 80
	9	27 30	31 50
	10	28 90	34 20
	11	31 65	36 90
	12	33 85	39 60
	14	41 40	48 00
	16	48 75	56 60
	18	56 15	65 20
	20	63 80	73 90
	22	71 50	82 80
	24	79 20	91 80
56	6	23 10	26 00
	7	25 50	28 40
	8	28 05	31 20
	9	29 60	34 10
	10	31 80	37 00
	11	34 35	39 90
	12	36 90	43 00
	14	44 60	51 90
	16	52 40	60 90
	18	60 30	69 90
	20	68 20	79 00
	22	76 20	88 10
	24	84 30	97 30
58	6	24 90	28 00
	7	27 40	30 60
	8	30 30	33 60
	9	32 00	36 70
	10	34 40	39 90
	11	37 10	43 10
	12	39 90	46 30
	14	48 00	55 60
	16	56 20	65 00
	18	64 40	74 50
	20	72 60	84 00
	22	80 90	93 60
	24	89 20	103 20
60	6	26 70	30 00
	7	29 40	32 70
	8	32 60	35 90
	9	34 40	39 30
	10	37 20	42 70
	11	40 10	46 20
	12	43 00	49 70
	14	51 40	59 40
	16	59 90	69 40
	18	68 50	79 40
	20	77 10	89 40
	22	85 70	99 40
	24	94 30	109 40



SPLIT PULLEYS.

Additional List Prices to be added to List Prices of Cast Iron or Wrought Rim Whole Pulleys.

Face.....	3	4	5	6	7	8	9	10	11	12	14	16	18	20	22	24	26	28	30	32	34	36
Diam., in.																						
6 to 11..	$1 00	1 15	1 25	1 45	1 60	1 75	1 90	2 05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12 to 17..	1 05	1 20	1 35	1 50	1 65	1 85	2 05	2 20	2 35	2 50	2 65	2 80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18 to 24..	1 15	1 35	1 55	1 70	1 85	2 05	2 30	2 45	2 60	2 75	3 05	3 40	3 75	4 00	4 30	4 80	5 40	.....	.....	.....	.....	.....
25 to 27..	1 25	1 45	1 65	1 85	2 05	2 25	2 50	2 80	3 10	3 40	3 75	4 25	4 75	5 25	5 80	6 45	7 05	.....	.....	.....	.....	.....
28 to 31..	1 45	1 65	1 85	2 10	2 35	2 60	2 85	3 10	3 40	3 70	4 05	4 60	5 10	5 70	6 35	7 00	7 60	8 25	8 90	.....	.....	.....
32 to 36..	1 70	1 90	2 10	2 35	2 60	2 85	3 15	3 45	3 70	4 00	4 50	5 10	5 75	6 40	7 05	7 70	8 40	9 10	9 90	.....	.....	.....
37 to 40.	.....	2 40	2 60	2 90	3 15	3 40	3 70	4 00	4 30	4 60	5 15	5 70	6 50	7 20	7 90	8 60	9 30	10 00	10 70	.....	.....	.....
41 to 44.	.....	2 90	3 10	3 40	3 60	3 80	4 10	4 40	4 70	5 00	5 60	6 35	7 05	7 90	8 70	9 50	10 30	11 10	12 10	.....	.....	.....
45 to 48.	.....	3 30	3 50	3 70	3 90	4 20	4 60	4 90	5 30	5 70	6 50	7 30	8 10	9 00	9 90	10 80	11 70	12 70	13 80	.....	.....	.....
50 to 52.	.....	.....	.....	4 10	4 30	4 75	5 10	5 50	5 90	6 30	7 00	7 80	8 70	9 60	10 50	11 40	12 30	13 30	14 40	15 40	16 50	17 60
54 to 56.	.....	.....	.....	4 50	4 80	5 20	5 60	6 00	6 40	6 80	7 60	8 40	9 30	10 30	11 30	12 30	13 30	14 30	15 20	16 40	17 50	18 70
58 to 60.	.....	.....	.....	4 90	5 20	5 75	6 15	6 55	6 95	7 35	8 10	9 10	10 10	11 10	12 10	13 10	14 20	15 40	16 60	17 80	19 00	20 20
62 to 64.	.....	.....	.....	5 30	5 60	6 10	6 50	7 00	7 45	7 90	8 70	9 70	10 70	11 70	12 70	13 70	14 90	16 20	17 30	18 70	20 00	21 30
66 to 68.	.....	.....	.....	5 70	6 00	6 45	6 85	7 30	7 75	8 20	9 10	10 10	11 10	12 20	13 30	14 40	15 70	16 90	18 10	19 50	20 90	22 40
70 to 72.	.....	.....	.....	6 10	6 40	6 90	7 35	7 80	8 25	8 70	9 80	10 90	12 00	13 20	14 40	15 60	17 20	18 70	20 10	21 60	23 10	24 50
74 to 76.	.....	.....	.....	6 50	6 80	7 35	7 80	8 25	8 70	9 20	10 30	11 50	12 70	13 95	15 20	16 70	18 30	19 90	21 60	23 30	24 90	26 50
78 to 80.	.....	.....	.....	.....	.....	7 80	8 25	8 70	9 15	9 70	10 85	12 10	13 30	14 60	15 90	17 50	19 10	20 80	22 40	24 10	25 90	27 50
82 to 84.	.....	.....	.....	.....	.....	8 30	8 80	9 30	9 80	10 40	11 50	13 00	14 40	15 80	17 30	19 10	20 90	22 60	24 30	26 20	28 00	29 70
86 to 88.	.....	.....	.....	.....	.....	9 00	9 50	10 00	10 60	11 30	12 30	13 70	15 30	17 00	18 60	20 20	22 00	23 70	25 50	27 30	29 30	31 30
90 to 92.	.....	.....	.....	.....	.....	9 80	10 30	10 80	11 50	12 30	13 20	14 60	16 10	17 80	19 50	21 10	22 90	24 60	26 50	28 30	30 40	32 90
94 to 96..	.....	.....	.....	.....	.....	10 70	11 20	11 70	12 40	13 10	14 00	15 50	17 00	18 70	20 40	22 00	23 80	25 60	27 50	29 40	31 50	34 50
Face...	3	4	5	6	7	8	9	10	11	12	14	16	18	20	22	24	26	28	30	32	34	36

PLAIN TIGHT-AND-LOOSE PULLEYS.

Additional list prices per pair to be added to list prices of Whole Pulleys, either Cast Iron or Wrought Rim.

Face.	3	4	5	6	7	8	9	10	11	12
Bore.										
1 3/16	$0 80	$1 10	$1 40	$1 70	$2 00	$2 30	$2 60	$2 90	$3 20	$3 50
1 7/16	95	1 25	1 60	1 95	2 30	2 65	2 90	3 25	3 60	3 95
1 11/16	1 15	1 45	1 80	2 15	2 50	2 85	3 20	3 55	3 90	4 30
1 15/16	1 30	1 65	2 00	2 35	2 70	3 05	3 40	3 75	4 20	4 70
2 3/16	1 45	1 80	2 20	2 65	3 10	3 55	4 00	4 45	4 90	5 35
2 7/16	1 60	2 05	2 50	2 95	3 40	3 85	4 30	4 75	5 20	5 65
2 11/16	1 80	2 25	2 70	3 15	3 60	4 05	4 50	4 95	5 40	5 90
2 15/16	2 05	2 50	2 95	3 45	3 95	4 45	4 95	5 45	5 95	6 45

PATENT WROUGHT RIM WHOLE PULLEYS.

Diameter.	Face.	PRICE. Single Belt.	Double Belt.
8	3	$2 95	$3 30
	4	3 15	3 55
	5	3 40	3 80
	6	3 70	4 20
	7	4 00	4 60
	8	4 30	4 95
9	3	3 00	3 45
	4	3 25	3 70
	5	3 50	3 95
	6	3 80	4 35
	7	4 10	4 80
	8	4 40	5 10
10	3	3 10	3 55
	4	3 35	3 85
	5	3 60	4 15
	6	3 90	4 50
	7	4 20	5 00
	8	4 50	5 30
	9	4 80	5 65
	10	5 15	6 00
11	3	3 25	3 80
	4	3 55	4 15
	5	3 85	4 55
	6	4 20	$4 95
	7	4 55	5 35
	8	4 90	5 80
	9	5 25	6 20
	10	5 60	6 60
12	3	3 40	4 05
	4	3 70	4 40
	5	4 00	4 75
	6	4 30	5 10
	7	4 65	5 55
	8	5 00	6 00
	9	5 35	6 50
	10	5 70	7 00
	11	6 15	7 50
	12	6 70	8 00
13	3	3 55	4 30
	4	3 85	4 65
	5	4 15	5 00
	6	4 50	5 40
	7	4 85	5 80
	8	5 20	6 20
	9	5 55	6 65
	10	6 00	7 15
	11	6 50	7 65
	12	7 00	8 25
14	3	3 75	4 50
	4	4 10	4 85
	5	4 45	5 25
	6	4 80	5 65
	7	5 20	6 10
	8	5 60	6 55
	9	6 10	7 05
	10	6 40	7 55
	11	6 80	8 05
	12	7 35	8 55
	14	8 35	9 85
15	3	3 95	4 75
	4	4 25	5 10
	5	4 60	5 50
	6	4 95	5 90
	7	5 30	6 35
	8	5 70	6 85
	9	6 10	7 35
	10	6 50	7 85
	11	7 00	8 35
	12	7 50	8 85
	14	8 60	10 10
16	3	4 15	5 05
	4	4 45	5 40
	5	4 80	5 75
	6	5 15	6 20
	7	5 50	6 65
	8	5 90	7 15
	9	6 30	7 65
	10	6 70	8 15
	11	7 20	8 65
	12	7 70	9 15
	14	8 95	10 45
	16	10 25	11 90
17	3	4 35	5 30
	4	4 65	5 65
	5	5 00	6 00
	6	5 35	6 35
	7	5 75	6 80
	8	6 15	7 30
	9	6 65	7 80
	10	7 00	8 30
	11	7 50	8 80
	12	8 00	9 30
	14	9 25	10 80
	16	10 60	12 30
18	3	4 55	5 50
	4	4 85	5 85
	5	5 25	6 25
	6	5 65	6 65
	7	6 05	7 10
	8	6 50	7 65
	9	7 00	8 25
	10	7 55	8 90
	11	8 10	9 60
	12	8 65	10 30
	14	9 90	12 00
	16	11 30	13 70
	18	13 40	16 40
19	3	4 80	5 75
	4	5 20	6 20
	5	5 65	6 65
	6	6 05	7 10
	7	6 45	7 55
	8	6 95	8 30
	9	7 45	9 00
	10	8 00	9 75
	11	8 55	10 50
	12	9 10	11 30
	14	10 40	13 10
	16	11 80	14 90
	18	13 90	17 00
20	3	4 95	5 95
	4	5 35	6 40
	5	5 80	7 15
	6	6 25	7 90
	7	6 70	8 65
20	8	7 15	9 40
	9	7 65	10 15
	10	8 15	10 90
	11	8 70	11 65
	12	9 25	12 40
	14	10 65	14 00
	16	12 15	15 90
	18	14 35	17 80
	20	16 70	19 90
21	3	5 10	6 15
	4	5 50	6 60
	5	5 95	7 40
	6	6 40	8 20
	7	6 85	9 00
	8	7 30	9 80
	9	7 85	10 60
	10	8 40	11 40
	11	8 95	12 20
	12	9 50	13 00
	14	11 00	15 00
	16	13 00	17 00
	18	15 35	19 00
	20	17 70	21 00
22	3	5 25	6 35
	4	5 65	6 80
	5	6 10	7 65
	6	6 55	8 50
	7	7 00	9 35
	8	7 45	10 20
	9	8 00	11 05
	10	8 55	11 90
	11	9 10	12 75
	12	9 65	13 60
	14	11 75	15 80
	16	14 00	18 05
	18	16 35	20 30
	20	18 70	22 65
23	3	5 40	6 55
	4	5 80	7 00
	5	6 25	7 85
	6	6 70	8 70
	7	7 15	9 55
	8	7 60	10 40
	9	8 15	11 25
	10	8 75	12 10
	11	9 35	12 95
	12	9 95	13 80
	14	12 25	16 15
	16	15 30	18 55
	18	17 50	20 95
	20	20 00	23 35
24	3	5 60	6 80
	4	6 00	7 20
	5	6 45	8 15
	6	7 00	9 00
24	7	7 50	9 90
	8	8 10	10 80
	9	8 75	11 70
	10	9 40	12 60
	11	10 05	13 50
	12	10 70	14 40
	14	13 10	16 80
	16	16 20	19 20
	18	18 40	21 60
	20	20 90	24 00
	22	23 40	26 50
	24	26 00	29 00
25	3	6 30	7 30
	4	6 65	7 75
	5	7 30	8 70
	6	8 05	9 60
	7	9 00	10 65
	8	9 80	11 75
	9	10 35	12 45
	10	11 25	13 40
	11	12 30	14 40
	12	13 40	15 50
	14	15 60	17 50
	16	17 90	19 80
	18	20 20	22 10
	20	22 60	24 50
	22	25 20	27 10
	24	27 80	30 00
	26		33 25
26	3	6 70	7 60
	4	7 05	8 10
	5	7 60	8 95
	6	8 50	9 95
	7	9 45	10 95
	8	10 40	12 00
	9	11 30	12 95
	10	12 25	13 85
	11	13 20	14 90
	12	14 10	15 95
	14	16 30	18 25
	16	18 70	20 65
	18	21 10	23 05
	20	23 60	25 60
	22	26 40	28 50
	24	29 60	31 70
	26		34 90
27	3	6 90	7 75
	4	7 30	8 25
	5	7 90	9 10
	6	8 85	10 10
	7	9 80	11 30
	8	10 75	12 50
	9	11 70	13 50
	10	12 70	14 60
	11	13 70	15 50
	12	14 60	16 50
	13	16 90	19 00
	16	19 30	21 60
	18	21 60	23 90
	20	24 50	26 80
	22	28 00	30 30
	24	31 50	33 80
	26		37 30

Diameter.	Face.	PRICE. Single Belt.	Double Belt.	Triple Belt.
20	3	4 95	5 95	
	4	5 35	6 40	
	5	5 80	7 15	
	6	6 25	7 90	
	7	6 70	8 65	
20	8	7 15	9 40	11 20
	9	7 65	10 15	12 25
	10	8 15	10 90	13 40
	11	8 70	11 65	14 60
	12	9 25	12 40	15 90
	14	10 65	14 00	18 00
	16	12 15	15 90	20 20
	18	14 35	17 80	22 50
	20	16 70	19 90	24 90
21	3	5 10	6 15	
	4	5 50	6 60	
	5	5 95	7 40	
	6	6 40	8 20	
	7	6 85	9 00	
	8	7 30	9 80	11 80
	9	7 85	10 60	12 90
	10	8 40	11 40	14 05
	11	8 95	12 20	15 35
	12	9 50	13 00	16 65
	14	11 00	15 00	18 90
	16	13 00	17 00	21 20
	18	15 35	19 00	23 60
	20	17 70	21 00	26 20
22	3	5 25	6 35	
	4	5 65	6 80	
	5	6 10	7 65	
	6	6 55	8 50	
	7	7 00	9 35	
	8	7 45	10 20	12 40
	9	8 00	11 05	13 55
	10	8 55	11 90	14 70
	11	9 10	12 75	16 00
	12	9 65	13 60	17 30
	14	11 75	15 80	19 80
	16	14 00	18 05	22 20
	18	16 35	20 30	24 80
	20	18 70	22 65	27 40
23	3	5 40	6 55	
	4	5 80	7 00	
	5	6 25	7 85	
	6	6 70	8 70	
	7	7 15	9 55	
	8	7 60	10 40	12 80
	9	8 15	11 25	14 00
	10	8 75	12 10	15 30
	11	9 35	12 95	16 70
	12	9 95	13 80	18 10
	14	12 25	16 15	20 70
	16	15 30	18 55	23 20
	18	17 50	20 95	26 00
	20	20 00	23 35	29 00
24	3	5 60	6 80	
	4	6 00	7 20	
	5	6 45	8 15	
	6	7 00	9 00	

WROUGHT RIM WHOLE PULLEYS—Continued.

Diameter.	Face.	PRICE. Single Belt.	Double Belt.	Triple Belt.
28	3	7 20	8 00	
	4	7 60	8 50	
	5	8 35	9 35	
	6	9 30	10 35	
	7	10 25	11 50	
	8	11 10	12 70	$16 00
	9	12 05	13 85	17 35
	10	13 10	14 95	18 80
	11	14 15	16 00	20 30
	12	15 15	17 15	21 90
	14	17 40	19 75	25 00
	16	19 75	22 60	28 60
	18	22 60	25 50	32 50
	20	25 50	28 40	36 90
	22	28 40	31 50	41 50
	24	32 20	35 30	46 20
	26		39 10	52 00
29	3	7 45	8 20	
	4	7 85	8 70	
	5	8 65	9 60	
	6	9 55	10 55	
	7	10 50	11 85	
	8	11 45	13 10	16 40
	9	12 40	14 20	17 80
	10	13 50	15 30	19 30
	11	14 55	16 50	20 90
	12	15 60	17 85	22 65
	14	18 05	20 50	26 00
	16	20 65	23 45	29 90
	18	23 20	26 00	34 00
	20	26 30	29 15	38 20
	22	30 00	32 90	42 90
	24	33 80	36 70	47 70
	26		40 60	53 60
	28		44 50	57 60
	30		48 25	61 50
30	3	7 70	8 45	
	4	8 10	8 95	
	5	8 95	9 85	
	6	9 80	10 85	
	7	10 75	12 10	
	8	11 85	13 30	16 70
	9	12 85	14 65	18 25
	10	13 90	15 90	20 00
	11	15 00	17 20	21 90
	12	16 10	18 55	23 90
	14	18 75	21 20	26 60
	16	21 50	24 20	30 90
	18	24 30	27 10	35 10
	20	27 50	30 60	40 00
	22	31 00	35 00	45 00
	24	34 50	38 50	50 00
	26	38 20	42 20	55 00
	28	42 00	46 00	60 00
	30	46 00	50 00	66 00
31	3	7 90	8 70	
	4	8 35	9 15	
	5	9 20	10 10	
	6	10 10	11 15	
	7	11 10	12 50	
	8	12 10	14 00	17 50
	9	13 10	15 35	19 25
31	10	14 25	16 55	21 10
	11	15 45	17 75	23 10
	12	16 65	19 10	25 10
	14	19 70	22 15	28 20
	16	22 75	25 30	31 50
	18	26 00	28 60	35 80
	20	29 25	31 85	40 80
	22	32 75	36 75	46 00
	24	36 25	40 25	51 30
	26	39 75	43 75	56 80
	28	43 35	47 35	62 40
	30	47 00	51 50	68 10
32	3	8 15	8 95	
	4	8 60	9 40	
	5	9 50	10 40	
	6	10 40	11 45	
	7	11 40	12 90	
	8	12 50	14 25	17 90
	9	13 50	15 55	19 70
	10	14 60	16 85	21 60
	11	15 90	18 30	23 70
	12	17 25	19 70	26 00
	14	20 60	23 05	29 60
	16	24 00	26 50	33 30
	18	27 40	29 90	38 00
	20	30 80	33 30	42 80
	22	34 40	38 00	47 80
	24	38 50	42 10	52 90
	26	41 60	45 20	58 10
	28	45 25	48 85	63 60
	30	49 00	53 75	69 20
33	3	8 35	9 15	
	4	8 80	9 65	
	5	9 70	10 65	
	6	10 70	11 75	
	7	11 80	13 30	
	8	12 90	14 60	18 40
	9	14 00	16 00	20 30
	10	15 10	17 40	22 30
	11	16 40	18 85	24 50
	12	17 75	20 30	26 90
	14	21 50	24 00	31 00
	16	24 35	27 00	35 20
	18	28 15	30 80	39 60
	20	32 00	34 70	44 10
	22	35 90	39 50	49 10
	24	39 70	43 40	54 20
	26	43 50	47 20	59 50
	28	47 30	51 10	65 00
	30	51 10	56 00	70 60
34	3	8 55	9 35	
	4	9 00	9 85	
	5	10 00	10 90	
	6	11 00	12 05	
	7	12 20	13 40	
	8	13 35	15 05	19 10
	9	14 45	16 55	21 10
	10	15 50	18 00	23 20
	11	16 90	19 55	25 50
	12	18 30	21 00	27 90
	14	22 10	24 80	32 20
	16	25 90	28 60	36 70

Diameter.	Face.	PRIC Single Belt.	Double Belt.	Triple Belt.
34	18	29 70	32 40	41 30
	20	33 50	36 35	46 00
	22	38 30	41 60	50 90
	24	42 10	45 45	56 00
	26	45 90	49 70	61 30
	28	49 70	53 35	66 80
	30	52 60	58 00	73 00
35	3	8 80	9 65	
	4	9 25	10 10	
	5	10 25	11 15	
	6	11 30	12 35	
	7	12 50	14 05	
	8	13 70	15 50	19 80
	9	14 90	17 35	21 95
	10	16 10	18 55	24 15
	11	17 50	20 15	26 55
	12	18 95	21 75	29 00
	14	22 95	25 75	33 30
	16	26 95	29 75	37 90
	18	31 00	33 80	42 70
	20	35 00	37 80	47 70
	22	39 00	43 00	53 00
	24	43 00	47 00	58 50
	26	47 00	51 00	64 20
	28	51 00	55 00	70 10
	30	55 00	60 50	76 10
36	3	9 05	9 90	
	4	9 50	10 35	
	5	10 50	11 50	
	6	11 60	12 70	
	7	12 80	14 25	
	8	14 00	16 05	20 65
	9	15 25	17 70	22 90
	10	16 45	19 25	25 20
	11	18 00	21 00	27 70
	12	19 60	22 50	30 30
	14	23 60	26 45	34 80
	16	27 60	30 45	39 50
	18	31 60	34 50	44 40
	20	35 60	38 85	49 50
	22	40 00	45 00	54 80
	24	44 40	49 40	60 30
	26	48 80	53 80	66 00
	28	53 20	58 30	71 90
36	30	57 60	$63 70	$78 00
37	4	9 75	10 60	
	5	10 75	11 75	
	6	11 90	13 05	
	7	13 15	15 05	
	8	14 50	16 65	21 50
	9	15 90	18 35	23 90
	10	17 35	20 00	26 30
	11	18 90	21 70	29 00
	12	20 45	23 55	31 80
	14	24 45	27 35	36 50
	16	28 45	31 35	41 40
	18	32 45	35 40	46 50
	20	36 45	39 65	51 80
	22	41 00	46 50	57 30
	24	45 50	50 80	63 00
	26	50 00	55 40	68 90
	28	54 50	60 25	75 00
	30	59 00	65 65	81 30

Diameter.	Face.	PRICE. Single Belt.	Double Belt.	Triple Belt.
38	4	10 00	10 90	
	5	11 10	12 15	
	6	12 25	13 50	
	7	13 65	15 50	
	8	15 10	17 20	22 50
	9	16 55	19 00	24 95
	10	18 00	20 85	27 45
	11	19 65	22 50	30 30
	12	21 30	24 50	33 30
	14	25 30	28 50	38 10
	16	29 30	32 55	43 10
	18	33 30	36 70	48 30
	20	38 00	41 50	53 70
	22	42 70	48 00	59 30
	24	47 40	52 75	65 10
	26	52 10	57 45	71 10
	28	55 90	61 35	77 30
	30	60 70	67 55	83 70
39	4	10 25	11 15	
	5	11 50	12 50	
	6	12 75	14 00	
	7	14 30	16 30	
	8	15 90	17 90	23 60
	9	17 50	19 65	26 20
	10	19 10	21 70	28 80
	11	20 80	23 40	31 80
	12	22 70	25 45	35 00
	14	26 70	30 40	40 00
	16	30 70	34 40	45 20
	18	34 70	38 45	50 40
	20	39 40	43 30	56 00
	22	44 10	49 90	61 80
	24	48 90	54 70	67 80
	26	53 70	59 50	74 00
	28	58 50	64 35	80 40
	30	63 30	69 65	87 00
40	4	10 50	11 90	
	5	11 85	13 40	
	6	13 20	15 00	
	7	15 00	17 35	
	8	16 90	19 30	25 10
	9	18 80	21 25	27 80
	10	20 70	23 50	30 70
	11	22 60	25 50	33 90
	12	24 50	27 70	37 30
	14	28 50	32 00	42 50
	16	32 50	36 90	47 90
	18	36 50	41 60	53 50
	20	40 50	46 00	59 30
	22	45 50	53 75	65 30
	24	50 50	59 10	71 50
	26	55 50	64 40	77 90
	28	60 50	69 50	84 50
	30	65 50	75 20	91 30
41	4	10 90	12 20	
	5	12 30	13 75	
	6	13 75	15 30	
	7	15 60	17 85	
	8	17 45	20 00	26 60
	9	19 40	22 00	28 90
	10	21 35	24 35	31 90
	11	23 30	26 40	35 30

KEY-SEATING PULLEYS.

Width of face, inches		3 to 5	6 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 30	31 to 36
Width of key-seat. ¼-inch.	Diameter of shaft. 1 to 1 7/8-inch	$0 36	36	.....	.....	.....	.....	.....	.....
3/8 "	1 7/16 to 1 15/16 inch	36	36	45	.....	.....	.....	.....	.....
½ "	1 7/8 to 2 5/16 "	36	45	54	65	1 00	.....	.....	.....
5/8 "	2 3/8 to 2 13/16 "	45	54	62	78	1 20	.....	.....	.....
¾ "	2 13/16 to 3 1/4 "	54	62	66	85	1 30	1 70	2 10	3 30
7/8 "	3 5/16 to 3 11/16 "	60	66	78	1 00	1 70	2 10	2 50	3 60
1 "	3 9/16 to 4 1/4 "	66	78	85	1 30	2 10	2 50	3 00	4 20
1 1/8 "	4 5/16 to 4 11/16 "	85	1 00	1 30	1 70	2 50	3 00	3 30	4 55
1 ¼ "	4 3/4 to 5 1/4 "	1 10	1 30	1 70	2 15	3 00	3 30	3 80	5 10

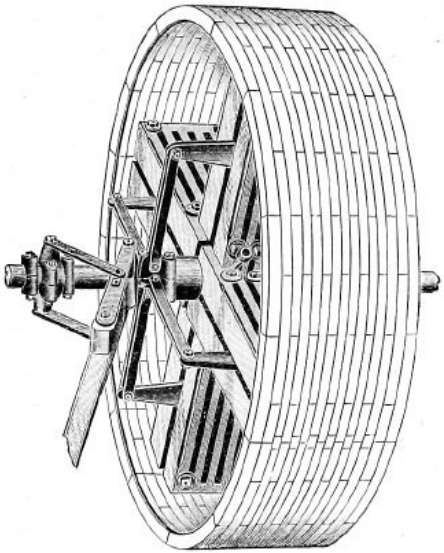
We are prepared to furnish any size key seat not mentioned in above list.

KEYS FOR PULLEYS.

Width of face, inches			3 to 5	6 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 30	31 to 36
Width of key. ¼-inch.	Diam. of shaft. 1 to 1 3/8 inch.	Price, not fitted	$0 20	27	.....	.....	.....	.....	.....	.....
		Price, fitted	65	80	.....	.....	.....	.....	.....	.....
3/8 "	1 7/16 to 1 15/16 "	Price, not fitted	23	27	30	.....	.....	.....	.....	.....
		Price, fitted	1 15	1 35	1 55	.....	.....	.....	.....	.....
½ "	1 7/8 to 2 5/16 "	Price, not fitted	30	33	36	48	60	.....	.....	.....
		Price, fitted	1 50	1 65	1 85	2 20	2 60	.....	.....	.....
5/8 "	2 3/8 to 2 3/4 "	Price, not fitted	30	36	48	60	80	.....	.....	.....
		Price, fitted	1 60	1 85	2 15	2 50	3 00	.....	.....	.....
¾ "	2 13/16 to 3 1/4 "	Price, not fitted	36	48	54	72	1 00	1 70	1 80	1 90
		Price, fitted	1 70	2 05	2 35	2 80	3 35	4 60	5 10	5 70
7/8 "	3 5/16 to 3 11/16 "	Price, not fitted	48	54	66	85	1 20	1 80	2 00	2 10
		Price, fitted	2 00	2 25	2 75	3 35	4 15	5 10	5 75	6 30
1 "	3 13/16 to 4 1/4 "	Price, not fitted	60	66	85	1 00	1 45	2 00	2 15	2 35
		Price, fitted	2 30	2 75	3 35	4 00	4 75	5 75	6 30	7 00
1 1/8 "	4 5/16 to 4 11/16 "	Price, not fitted	72	85	1 00	1 20	1 70	2 40	2 50	2 65
		Price, fitted	2 80	3 35	4 00	4 50	5 50	6 60	7 15	7 65
1 ¼ "	4 3/4 to 5 1/4 "	Price, not fitted	90	1 00	1 20	1 55	2 00	2 50	3 10	3 30
		Price, fitted	3 40	4 00	4 50	5 35	6 25	7 50	8 10	8 70

See lists for key-seating shafts and pulleys.
Prices of fitted keys do not include key-seating pulleys nor shafts.

"THE REEVES" WOOD-SPLIT PULLEY CLUTCH.

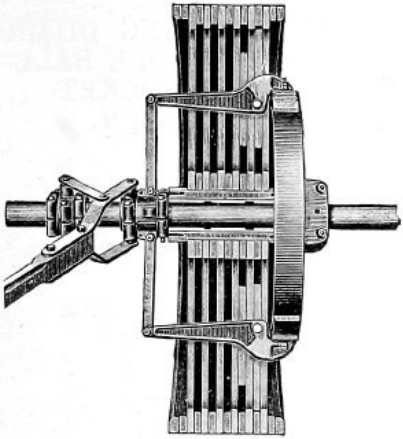


"THE REEVES" CLUTCH.
Adjusted for Operation and Engaged.

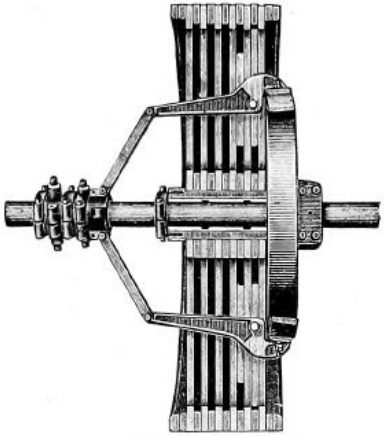
We claim for "The Reeves" Wood-Split Pulley Clutch the two points that it is the most convenient and the most economical device obtainable for "throwing in and out" any and all kinds of machinery.

By use of "The Reeves" Clutch the belt stands still when not in use and is never shifted. The shifting is what gets a belt out of shape and makes a new one necessary. Every clutch under ordinary circumstances will save one belt, and possibly two, each year.

"The Reeves" shifting device is an entire departure in our clutch, and can only be fully appreciated by those who have ever had to construct an old-style clutch brake. Many mechanics have right along appreciated the all-around superiority of a clutch, but have had no substantial place upon which to anchor the fulcrum. In any other clutch on the market the fulcrum has to be anchored independent of the shaft. Our patented fulcrum is anchored to the shaft itself and is furnished all ready to be bolted into place. It can be attached anywhere on any shaft in a few moments' time. The practicability of the fulcrum on "The Reeves" shifting device has done as much to popularize the use of "The Reeves" Wood-Split Clutch as any other one feature.



Clutch Engaged.



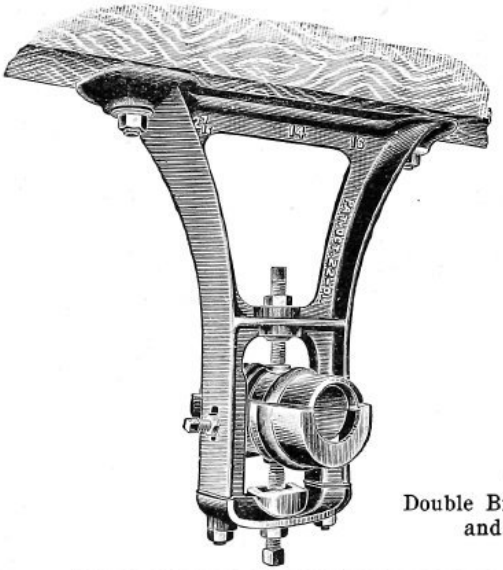
Clutch Disengaged.

PRICE LIST OF "THE REEVES" PATENT CLUTCH PULLEYS.

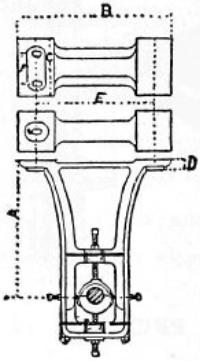
Most commonly used sizes.

Diam. of Pulley.	Face of Pulley.	H. P. 100 Rev.	Price of Clutch and Pulley.	Diam. of Pulley.	Face of Pulley.	H. P. 100 Rev.	Price of Clutch and Pulley.	Diam of Pulley.	Face of Pulley.	H. P. 100 Rev.	Price of Clutch and Pulley.	Diam of Pulley	Face of Pulley.	H. P. 100 Rev.	Price of Clutch and Pulley.
16	4	3.25	$29 00	26	5	10.30	$46 10	32	16	40.48	$ 99 80	40	5	15 85	$ 80 40
	5	4.00	30 15		6	12.36	48 40	34	5	13.45	63 35		6	19.02	84 40
	6	4.50	31 25		7	14.42	50 80		6	16.14	66 50		7	22 19	88 65
	8	7 50	35 00		8	16.48	53 35		7	18.83	69 85		8	25.36	93 05
18	4	5.40	31 70		9	18.54	56 00		8	21.52	73 30		9	28.53	99 70
	5	6.75	32 95		10	20.60	58 80		9	24.21	76 95		10	31.70	102 60
	6	8.10	34 30		11	22.66	61 75		10	26.90	80 85		11	34.87	107 75
	7	9.45	35 65		12	24.72	64 80		11	29 59	84 45		12	38.04	113 10
	8	10.80	37 10	28	5	11.10	49 65		12	32.28	89 10		14	44 38	124 70
20	4	6.00	34 30		6	13 32	52 15		14	37.66	98 20		16	50.72	137 45
	5	7.50	35 70		7	15.54	54 75		16	43.04	108 30		18	57.06	151 55
	6	9.00	37 10		8	17.76	57 45	36	5	14.25	68 80		20	63.40	167 10
	7	10.50	38 60		9	19.98	60 35		6	17.10	72 20	42	5	16.65	86 95
	8	12 00	40 15		10	22.20	63 35		7	19.95	75 80		6	19.98	91 30
	9	13 50	41 75		11	24 42	66 50		8	22.80	79 60		7	23.31	95 85
	10	15.00	43 40		12	26.64	69 80		9	25.65	83 60		8	26 64	100 55
22	4	6.96	37 30	30	5	11.90	53 85		10	28.50	87 75		9	29.97	105 55
	5	8.70	38 85		6	14.28	56 55		11	31.35	92 15		10	33.30	110 85
	6	10.44	40 45		7	16.66	59 35		12	34.20	96 75		11	36.63	116 40
	7	12.18	42 15		8	19.04	62 30		14	39.90	106 65		12	39.96	122 20
	8	13 92	42 90		9	21.42	65 45		16	45.60	117 55		14	46.62	134 70
	9	15.66	45 75		10	23.80	68 70		20	57.00	142 90		16	53.28	148 50
	10	17.40	47 65		11	26.18	72 15	38	5	15.05	74 35		18	59.94	163 75
	11	19.14	49 65		12	28.56	75 75		6	18.06	78 05		20	66.60	180 50
	12	20.88	51 70		14	33 32	83 45		7	21.07	81 95		22	73 26	199 00
24	4	7.68	40 45		16	38.08	92 00		8	24.08	86 05		24	79.92	219 35
	5	9.60	42 15	32	5	12.65	58 40		9	27.09	90 35	44	5	17.45	94 05
	6	11.52	43 90		6	15.18	61 30		10	30.10	94 85		6	20.94	98 75
	7	13.44	45 75		7	17.71	64 40		11	33.11	99 60		7	24.43	103 70
	8	15 36	47 65		8	20 24	67 60		12	36 12	104 60		8	27.92	108 85
	9	17.28	49 65		9	22.77	70 95		14	42.14	115 30		9	31.41	114 30
	10	19.20	51 70		10	25 30	74 50		16	48.16	127 10		10	34 90	120 00
	11	21.12	53 85		11	27.83	78 20		18	54.18	140 10		11	38.39	126 00
	12	23.04	56 05		12	30.36	82 15		20	60.20	154 45		12	41.88	132 30
26	4	8 24	43 90		14	35.42	90 55						14	48.86	145 85

All sizes from 16 to 114 inches. Prices on request.



PATENT RING OILING, ADJUSTABLE BALL AND SOCKET HANGER.



Double Brace, Parting Hanger, Floor Stand and Wall Bracket, Ring Oiling, Babbitted Bearings.

Shaft, size	Drop A	Price	Length of Boxes	Base B	Base C	Thickness D	Bolt Holes E	Number of Bolts	Size of Bolts
I 1 3/16	6 to 8	$ 4 50	5	13	4	1 1/8	9 1/2	2	5/8
	10 to 12	5 00	5	14 3/4	4	1 1/8	11	2	5/8
	13 to 15	5 50	5	15 3/4	4 7/8	1 1/8	12	2	5/8
	16 to 18	6 00	5	17 1/4	5 1/8	1 1/8	13 1/2	2	5/8
	19 to 21	7 00	5	18 3/4	5 1/8	1 1/8	15	2	5/8
I 1 7/16	6 to 8	5 00	6	13	4	1 1/8	9 1/2	2	5/8
	10 to 12	5 50	6	14 3/4	4	1 1/8	11	2	5/8
	13 to 15	6 00	6	15 3/4	4 7/8	1 1/8	12	2	5/8
	16 to 18	6 50	6	17 1/4	5 1/8	1 1/8	13 1/2	2	5/8
	19 to 21	7 50	6	18 3/4	5 1/8	1 1/8	15	2	5/8
I 1 11/16	6 to 8	6 00	7	14	4 1/2	1 1/8	11	2	5/8
	10 to 12	6 50	7	15 1/2	4 5/8	1 1/8	11 1/2	2	5/8
	13 to 15	7 00	7	16 3/4	4 5/8	1 1/8	13	2	5/8
	16 to 18	7 50	7	19 1/4	5 1/4	1 1/8	15	2	5/8
	20 to 22	8 00	7	20 3/4	5 1/2	1 1/8	17	2	5/8
	24 to 26	8 50	7	22 1/4	6	1 1/8	18	2	5/8
	26 to 28	9 50	7	27 1/2	7 1/2	1 1/4	23	2	3/4
	30 to 32	10 50	7	29	7 1/4	1 7/16	24 1/4	2	3/4
	34 to 36	12 50	7	31 5/8	7 1/2	1 3/8	27	2	3/4

Shaft, size	Drop A	Price	Length of Boxes	Base B	Base C	Thickness D	Bolt Holes E	Number of Bolts	Size of Bolts
1 15/16	6 to 8	7 00	8	14	4 1/2	1 1/8	11	2	5/8
	10 to 12	7 50	8	15 1/2	4 3/4	1 1/8	11 1/2	2	5/8
	13 to 15	8 00	8	16 3/4	4 3/8	1 1/8	13	2	5/8
	16 to 18	8 50	8	19 1/4	5 1/4	1 1/8	15	2	5/8
	20 to 22	9 00	8	20 3/4	5 1/2	1 1/8	17	2	5/8
	24 to 26	10 00	8	22 1/4	6	1 1/8	18	2	5/8
	26 to 28	13 00	8	27 1/2	7 1/2	1 1/4	23	2	5/8
	30 to 32	14 00	8	29	7 1/4	1 1/8	24 1/4	2	3/4
	34 to 36	16 00	8	31 5/8	7 1/2	1 3/8	27	2	3/4
2 3/16	8 to 10	9 00	8 3/4	17 1/4	5	1 1/4	13	2	3/4
	11 to 13	9 50	8 3/4	19	5 1/2	1 1/4	15	2	3/4
	14 to 16	10 00	8 3/4	21	6	1 1/4	17	2	3/4
	18 to 20	10 50	8 3/4	23	6 1/4	1 1/4	19	2	3/4
	22 to 24	11 00	8 3/4	25 1/2	7	1 1/4	21	2	3/4
	26 to 28	12 00	8 3/4	27 1/2	7 1/2	1 1/4	23	2	3/4
	30 to 32	15 00	8 3/4	29	7 1/4	1 1/8	24 1/4	2	3/4
	34 to 36	18 00	8 3/4	31 5/8	7 1/2	1 3/8	27	2	3/4
2 7/16	8 to 10	10 00	10	17 1/4	5	1 1/4	13	2	3/4
	11 to 13	10 75	10	19	5 1/2	1 1/4	15	2	3/4
	14 to 16	11 50	10	21	6	1 1/4	17	2	3/4
	18 to 20	12 50	10	23	6 1/4	1 1/4	19	2	3/4
	22 to 24	13 50	10	25 1/2	7	1 1/4	21	2	3/4
	26 to 28	15 00	10	27 1/2	7 1/2	1 1/4	23	2	3/4
	30 to 32	17 00	10	29	7 1/4	1 1/8	24 1/4	2	3/4
	34 to 36	20 00	10	31 5/8	7 1/2	1 3/8	27	2	3/4
2 11/16	8 to 10	12 50	12	18 1/4	6	1 5/8	14 1/2	2	1
	11 to 13	13 50	12	21	6 1/4	1 5/8	16 1/2	2	1
	14 to 16	14 50	12	23	6 3/4	1 5/8	18 1/2	2	1
	18 to 20	16 00	12	25	7 1/2	1 5/8	20 1/2	2	1
	22 to 24	17 50	12	27	8	1 5/8	22 1/2	2	1
	26 to 28	19 00	12	29	8 1/2	1 5/8	24 1/2	2	1
	30 to 32	22 00	12	33 1/2	9 1/2	1 3/4	28	2	1 1/8
	34 to 36	26 00	12	33 1/8	8 1/2	1 3/4	28 5/8	2	1
2 15/16	8 to 10	$14 00	12	18 1/4	6	1 5/8	14 1/2	2	1
	11 to 13	16 00	12	21	6 1/4	1 5/8	16 1/2	2	1
	14 to 16	17 00	12	23	6 3/4	1 5/8	18 1/2	2	1
	18 to 20	19 00	12	25	7 1/2	1 5/8	20 1/2	2	1
	22 to 24	20 50	12	27	8	1 5/8	22 1/2	2	1
	26 to 28	22 00	12	29	8 1/2	1 5/8	24 1/2	2	1
	30 to 32	25 00	12	33 1/2	9 1/2	1 3/4	28	2	1 1/8
	34 to 36	28 00	12	33 1/8	8 1/2	1 3/4	28 5/8	2	1
3 3/16	10 to 12	19 00	12 3/4	21	7	1 3/4	16 1/2	2	1 1/8
	14 to 16	21 00	12 3/4	23 1/2	7 1/2	1 3/4	18 1/2	2	1 1/8
	18 to 20	23 00	12 3/4	26	8	1 3/4	20 1/2	2	1 1/8
	22 to 24	24 50	12 3/4	28 1/2	8 1/2	1 3/4	23	2	1 1/8
	26 to 28	26 00	12 3/4	31	9	1 3/4	25 1/2	2	1 1/8
	30 to 32	28 00	12 3/4	33 1/2	9 1/2	1 3/4	28	2	1 1/8

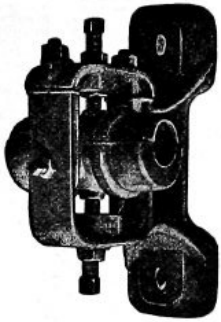
PATENT RING OILING, ADJUSTABLE, BALL AND SOCKET HANGER.

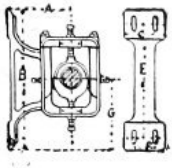
Shaft, size	Drop A	Price	Length of Boxes	Base B	Base C	Th'kness D	Bolt Holes E	Bolt Holes F	Number of Bolts	Size of Bolts
3 7/16	10 to 12	22 50	13 3/4	21	7	1 3/4	16 1/2		2	1 1/8
	14 to 16	25 00	13 3/4	23 1/2	7 1/2	1 3/4	18 1/2		2	1 1/8
	18 to 20	27 50	13 3/4	26	8	1 3/4	20 1/2		2	1 1/8
	22 to 24	29 00	13 3/4	28 1/2	8 1/2	1 3/4	23		2	1 1/8
	26 to 28	31 00	13 3/4	31	9	1 3/4	25 1/2		2	1 1/8
	30 to 32	32 50	13 3/4	33 1/2	9 1/2	1 3/4	28		2	1 1/8
3 11/16	10 to 12	25 00	14 3/4	23 7/8	8	1 7/8	18		2	1 1/8
	14 to 16	27 00	14 3/4	25 1/4	8 1/2	1 7/8	19 1/2		2	1 1/8
	18 to 20	29 00	14 3/4	27 7/8	9	1 7/8	22		2	1 1/8
	22 to 24	31 00	14 3/4	30 1/4	9 1/2	1 7/8	24 5/8		2	1 1/8
	26 to 28	33 00	14 3/4	32 7/8	10	1 7/8	26 7/8		2	1 1/8
	30 to 32	35 00	14 3/4	35 3/8	10 1/2	1 7/8	29 1/2		2	1 1/8
3 15/16	10 to 12	27 50	15 3/4	23 7/8	8	1 7/8	18		2	1 1/8
	14 to 16	29 50	15 3/4	25 1/4	8 1/2	1 7/8	19 1/2		2	1 1/8
	18 to 20	33 00	15 3/4	27 7/8	9	1 7/8	22		2	1 1/8
	22 to 24	34 50	15 3/4	30 1/4	9 1/2	1 7/8	24 1/2		2	1 1/8
	26 to 28	36 00	15 3/4	32 7/8	10	1 7/8	27		2	1 1/8
	30 to 32	37 50	15 3/4	35 3/8	10 1/2	1 7/8	29 1/2		2	1 1/8
4 3/16	11 to 13	31 00	16 3/4	24 3/8	9	2 1/8	18 1/2	3 7/8	4	1
	14 to 16	33 50	16 3/4	26 7/8	9 1/2	2 1/8	20 5/8	3 1/2	4	1
	18 to 20	37 00	16 3/4	29 3/8	10	2 1/8	23 1/4	4 1/2	4	1
	22 to 24	39 00	16 3/4	32	10 5/8	2 1/8	25 5/8	4 1/2	4	1
	26 to 28	41 00	16 3/4	34 3/8	11	2 1/8	28	4 15/16	4	1
	30 to 32	43 00	16 3/4	37	11 1/2	2 1/8	30 3/4	4 7/8	4	1
4 7/16	11 to 13	34 00	17 3/4	24 3/8	9	2 1/8	18 1/2	3 7/8	4	1
	14 to 16	37 00	17 3/4	26 7/8	9 1/2	2 1/8	20 5/8	3 1/2	4	1
	18 to 20	40 00	17 3/4	29 3/8	10	2 1/8	23 1/4	4 1/2	4	1
	22 to 24	43 00	17 3/4	32	10 1/2	2 1/8	25 5/8	4 1/2	4	1
	26 to 28	46 00	17 3/4	34 3/8	11	2 1/8	28 1/16	4 15/16	4	1
	30 to 32	50 00	17 3/4	37	11 1/2	2 1/8	30 3/4	4 7/8	4	1
4 11/16	11 to 13	37 00	18 3/4	26 3/8	9 3/4	2 3/8	20 1/8	3 7/8	4	1 1/4
	14 to 16	40 00	18 3/4	29	10 1/2	2 3/8	22 5/8	4 3/4	4	1 1/4
	18 to 20	43 00	18 3/4	31 1/4	10 1/2	2 3/8	24 3/4	4 3/4	4	1 1/4
	22 to 24	46 00	18 3/4	34	11 1/2	2 3/8	27 3/8	4 3/4	4	1 1/4
	26 to 28	49 00	18 3/4	36 1/2	12	2 3/8	30	5	4	1 1/4
	30 to 32	51 00	18 3/4	39	12 1/2	2 3/8	32 3/4	5 1/8	4	1 1/4
4 15/16	11 to 13	40 00	19 3/4	26 3/8	9 3/4	2 3/8	20 1/8	3 7/8	4	1 1/4
	14 to 16	43 00	19 3/4	29	10 1/2	2 3/8	22 5/8	4 3/4	4	1 1/4
	18 to 20	47 00	19 3/4	31 1/4	10 1/2	2 3/8	24 3/4	4 3/4	4	1 1/4
	22 to 24	51 00	19 3/4	34	11 1/2	2 3/8	27 3/8	4 3/4	4	1 1/4
	26 to 28	55 00	19 3/4	36 1/2	12	2 3/8	30	5	4	1 1/4
	30 to 32	60 00	19 3/4	39	12 1/2	2 3/8	32 3/4	5 1/8	4	1 1/4

We can also furnish 1 3/16", 1 7/16", 1 11/16", 1 15/16" sizes with 9" drop.

ADJUSTABLE BALL AND SOCKET POST HANGER.

Bearings Babbitted and Ring Oiling.



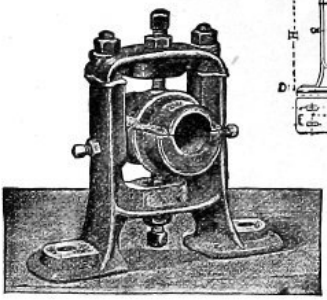


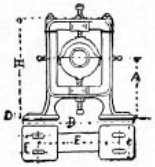
Size	Price	A	B	C	D	E	F	G Central position	No. of Bolts	Size of Bolts
1 3/16	$4 25	7 1/4	13 3/4	4 1/2	1 1/8	9 1/2	0	7 1/2	2	5/8
1 7/16	5 25	7 1/4	13 3/4	4 1/2	1 1/8	9 1/2	0	7 1/2	2	5/8
1 1/16	6 00	7 1/4	16	5 1/2	1 1/8	12	0	8 5/8	2	5/8
1 5/16	7 00	7 1/4	16	5 1/2	1 1/8	12	0	8 5/8	2	5/8
2 3/16	8 75	7 1/4	17 3/4	5 1/2	1 3/8	12 3/4	0	10 1/4	2	3/4
2 7/16	10 25	7 1/4	17 3/4	5 1/2	1 3/8	12 3/4	0	10 1/4	2	3/4
2 1/16	13 50	7 1/4	19 1/4	6	1 5/8	13 3/4	0	10 3/4	2	1
2 5/16	15 50	7 1/4	19 1/4	6	1 5/8	13 3/4	0	10 3/4	2	1
3 3/16	19 00	8 1/4	22 1/2	7	1 3/4	17 1/4	0	13 3/4	2	1 1/8
3 7/16	22 50	8 1/4	22 1/2	7	1 3/4	17 1/4	0	13 3/4	2	1 1/8
3 1/16	28 00	9 1/2	23 3/8	8	1 7/8	19 3/8	0	15 1/2	2	1 1/8
3 5/16	33 50	9 1/2	23 3/8	8	1 7/8	19 3/8	0	15 1/2	2	1 1/8
4 3/16	40 00	11	27 3/4	9	2 1/8	21 3/8	3 7/8	16 1/8	4	1
4 7/16	46 00	11	27 3/4	9	2 1/8	21 3/8	3 7/8	16 1/8	4	1
4 1/16	51 00	12 1/2	30 1/2	10	2 1/4	23 3/4	3 7/8	17 3/4	4	1 1/4
4 5/16	56 00	12 1/2	30 1/2	10	2 1/4	23 3/4	3 7/8	17 3/4	4	1 1/4

The best Post Hanger on the market with SIDE adjustment as well as vertical. Side adjustment ½ inch. Vertical 1 inch.

ADJUSTABLE BALL AND SOCKET PILLOW BLOCK.

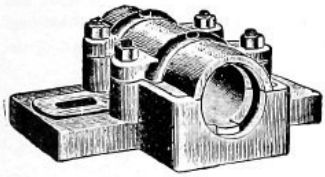
Bearings Babbitted and Ring Oiling.





Size	Price	A Central position	B	C	D	E	F	H	No. of Bolts.	Size of Bolts
1 3/16	$4 00	6 1/2	12 1/4	3	1	9	0	10 1/4	2	5/8
1 7/16	5 00	6 1/2	12 1/4	3	1	9	0	10 1/4	2	5/8
1 11/16	5 50	7 5/8	14	4 1/2	1 1/8	10 1/4	0	11 1/4	2	5/8
1 15/16	6 50	7 5/8	14	4 1/2	1 1/8	10 1/4	0	11 1/4	2	5/8
2 3/16	8 00	7 5/8	14 1/2	5 1/8	1 1/8	11	0	11 1/2	2	3/4
2 7/16	9 50	7 5/8	14 1/2	5 1/8	1 1/8	11	0	11 1/2	2	3/4
2 11/16	11 50	8 1/4	16	5 1/2	1 1/4	11 1/2	0	13	2	1
2 15/16	13 50	8 1/4	16	5 1/2	1 1/4	11 1/2	0	13	2	1
3 3/16	16 75	12	21	7	1 3/4	16 1/2	0	17	2	1 1/8
3 7/16	20 00	12	21	7	1 3/4	16 1/2	0	17	2	1 1/8
3 11/16	24 50	12	23 7/8	8	1 7/8	18	0	20	2	1 1/8
3 15/16	29 00	12	23 7/8	8	1 7/8	18	0	20	2	1 1/8
4 3/16	33 00	13	24 3/8	9 1/2	2 1/8	18 1/2	3 7/8	23	4	1
4 7/16	37 00	13	24 3/8	9 1/2	2 1/8	18 1/2	3 7/8	23	4	1
4 11/16	41 00	13 1/2	26 3/8	10 1/2	2 3/8	20 1/8	3 7/8	26	4	1 1/4
4 15/16	46 00	13 1/2	26 3/8	10 1/2	2 3/8	20 1/8	3 7/8	26	4	1 1/4

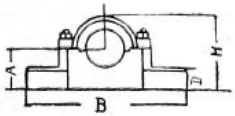
PILLOW BLOCKS.

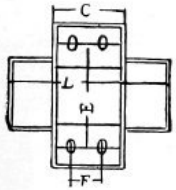


RIGID, RING OILING PILLOW BLOCK.

Size	Price	A	B	C	D	E	F	H	L	Bolts No.	Bolts Size
1	$3 75	1¾	8½	2	1	6⅛		3	5¼	2	½
1	4 65	1¾	9	2⅜	1⅛	7¼		3¼	6⅛	2	½
1	5 25	2¼	9	3	1¼	7¼		3⅝	7⅛	2	½
1	6 00	2⅜	9½	3⅜	1¼	7½		4	8⅜	2	⅝
2	7 00	2½	10⅝	3⅞	1¼	7⅝		4½	9⅛	2	⅝
2	8 00	2¾	11⅜	4⅜	1⅜	8¼		4⅝	10¼	2	⅝
2	9 25	3	11⅝	4⅝	1⅜	8¾		5	11	2	¾
2	10 40	3 1/16	11⅞	5⅛	1½	9⅛	3⅛	5½	12	4	¾
3	12 00	4	13⅜	6⅛	1⅝	10¼	4	7	13¼	4	¾
3	15 00	4¼	14¼	7⅛	1⅞	11⅝	4¾	7⅛	14	4	⅞
3	18 00	4½	15½	7½	2	12⅝	4¾	8	15	4	⅞
3	22 00	4½	16	8	2¼	13	5¼	8	15⅝	4	1
4	26 50	5	17⅝	8½	2⅜	14	6⅝	9	17½	4	1
4	30 00	5	17⅝	8½	2⅜	14	6⅝	9	17½	4	1
4	35 00	5½	18¼	9	2¾	14¾	6¼	9⅝	19⅜	4	1
4	40 00	5½	18¼	9	2¾	14¾	6¼	9⅝	19⅜	4	1

Intermediate sizes charged at next larger diameter



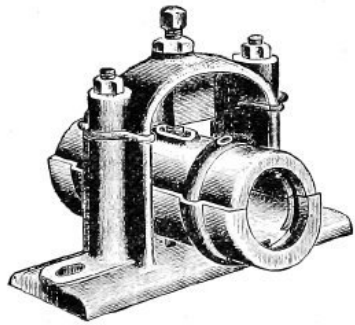


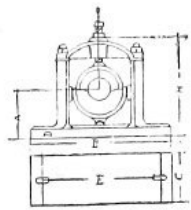
PEDESTAL PILLOW BLOCK.

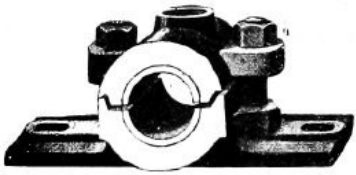
Fitted with Babbitted, Ring Oiling Boxes, Ball and Socket Adjustments.

Size	Price	A	B	C	D	E	H	Bolts No.	Bolts Size
1	$4 50	2¾	10⅛	2½	¾	8⅛	5½	2	½
1	5 50	2¾	10½	2⅝	⅞	8⅝	5¾	2	½
1	6 25	3¼	11⅞	3¼	1	9½	6⅜	2	⅝
1	7 25	3⅝	12	3⅛	1	9½	7⅛	2	⅝
2	8 50	3¾	12⅝	4⅛	1⅛	10¼	7⅛	2	⅝
2	10 00	4	14	4⅜	1⅛	11¼	8⅛	2	¾
2	12 00	4	14⅛	4¾	1¼	11¼	8⅝	2	¾
2	15 00	4¼	15¼	5⅛	1⅜	12½	9¼	2	¾
3	18 00	5¼	17¼	5⅞	1½	14	11⅜	2	⅞
3	21 50	5⅞	17½	6¼	1¾	14¼	12⅛	2	⅞
3	26 00	6¼	17¾	6¼	1¾	14¾	12½	2	⅞
3	32 00	6½	19¾	7⅛	1½	16¼	13½	2	1
4	38 50	7	22	7½	2⅛	18	14⅝	2	1
4	42 00	7	22	7½	2⅛	18	14⅝	2	1⅛
4	46 50	7⅝	23½	8	2¼	19¼	15½	2	1¼
4	52 00	7⅝	23½	8	2¼	19¼	15½	2	1¼

Intermediate sizes charged at next larger diameter.







COMMON FLAT BOXES.

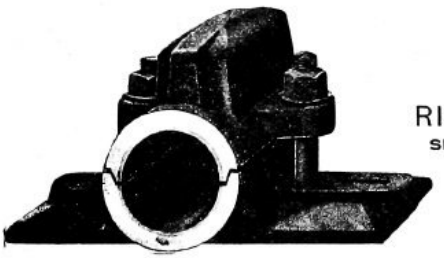
These boxes have entire surface of bearing babbitted there being no ribs to come in contact with the shaft, and the ends of boxes are faced off in lathe after babbitting. These boxes are not self-oiling, and are cheaper than the Rigid Pillow Blocks.

Diameter of shaft	1	1 1/16	1 1/8	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16
Length of bearing	3	3 1/2	3 1/2	4	4	4 1/2	4 1/2	5	5	5 1/2	5 1/2	6	6
Price	$0 90	1 00	1 10	1 30	1 50	1 90	2 20	2 70	3 20	3 70	4 20	4 80	5 50

SOLID JOURNAL BOXES.

BORED BEARINGS.

Diameter of shaft	1	1 1/16	1 1/8	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16
Length of bearing	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2
Price	$0 70	80	1 00	1 20	1 40	1 60	1 80	2 00	2 40



RIGID PILLOW BLOCKS.

SELF-OILING BABBITTED BEARINGS.

Diameter of shaft	1 1/16	1 1/8	1 11/16	1 15/16	2 1/16	2 1/8	2 11/16	2 15/16	3 1/16
Length of bearing	4 1/2	5	6	7	7 1/2	8	8 1/2	9	9 1/2
Price without base plate	$1 40	1 60	2 00	2 50	3 00	3 50	4 00	4 50	5 40
Price with base plate	$5 40	6 00	6 80	7 75	8 80	9 70	10 60	11 60	13 15

Diameter of shaft	3 1/16	3 1/8	3 15/16	4 1/16	4 1/8	4 11/16	4 15/16	5 1/16	5 1/16
Length of bearing	10	11	12	13	13	14	15	16 1/2	18
Price without base plate	$6 30	7 20	8 50	9 80	11 10	13 60	15 50	18 80	22 10
Price with base plate	$14 50	16 10	18 50	20 80	23 50	27 40	30 25	34 80	39 60

Cut No. 23.

RIGID POST HANGERS.

Bracket Adjustable Vertically—Box Adjustable Laterally—Self-Oiling Babbited Bearings.

We also make rigid post hangers, as shown in cut No. 23, furnished with self-oiling box, babbitted bearings. While the hanger is called a rigid hanger, adjustment can be had vertically by means of the slotted holes in back of bracket, and laterally through the slotted holes in base of pillow block.

Diameter of shaft	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16	5 7/16	5 15/16
Length of bearing	4 1/2	5	6	7	7 1/2	8	8 1/2	9	9 1/2	10	11	12	13	13	14	15	16 1/2	18
Center of shaft to back of hanger	5 3/8	5 3/8	6	6 7/8	6 1/2	6 5/8	7	7 1/2	8	8	8 1/2	8 1/2	8 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2
Price	$2 95	3 30	4 10	4 80	5 60	6 40	7 70	8 90	10 20	11 60	13 20	15 10	17 20	20 00	24 00	28 50	34 00	40 00

Can furnish hangers for intermediate sizes of shaft, at price of nearest size listed.

Cut No. 24.

SLOTTED BRACKETS.

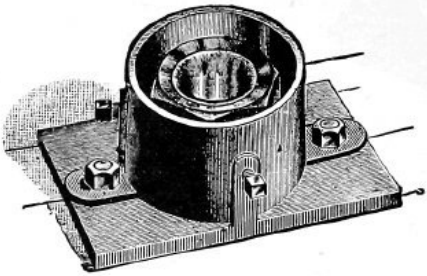
Without Pillow Block, but Including Bolts to Fasten Pillow Block.

We furnish slotted brackets, to which pillow blocks may be attached for use where it is desirable to get a longer extension from wall or post than can be obtained by using a rigid or adjustable post hanger. The price list is on the bracket only. When ordering, state whether you want common flat boxes, rigid or ball and socket pillow blocks attached.

Diameter of shaft	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16
Center of shaft to back of bracket, inches..12	$3.00	3.35	4.10	4.50	5.30	5.75	6.40	7.20	7.90	8.70	9.50	10.50	12.00	13.95	15.50	17.50
Center of shaft to back of bracket, inches..14	$3.25	3.60	4.35	4.85	5.70	6.25	7.00	7.70	8.40	9.20	10.00	11.25	12.75	14.50	16.50	18.25
Center of shaft to back of bracket, inches..16	$3.50	3.85	4.60	5.10	6.00	6.60	7.40	8.10	8.80	9.80	10.50	11.75	13.25	15.25	17.25	19.00
Center of shaft to back of bracket, inches..18	$3.75	4.10	4.85	5.35	6.30	7.00	7.90	8.50	9.25	10.50	11.25	12.50	14.00	16.00	18.00	20.00

ADJUSTABLE STEP BEARINGS.

WITH OIL POT.

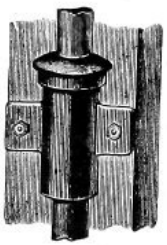


Adjustable in any direction, with tempered steel step. When desired brass bushed an additional charge is made.

PRICE LIST.

SIZE.	PRICE.	SIZE.	PRICE.	SIZE.	PRICE.
$1\frac{3}{16}$	$6.00	$2\frac{3}{16}$	$11.00	$3\frac{3}{16}$	$22.80
$1\frac{7}{16}$	6.75	$2\frac{7}{16}$	13.00	$3\frac{7}{16}$	26.20
$1\frac{11}{16}$	7.80	$2\frac{11}{16}$	16.00	$3\frac{11}{16}$	29.90
$1\frac{15}{16}$	9.20	$2\frac{15}{16}$	20 00	$3\frac{15}{16}$	36.00

RIGID VERTICAL BEARINGS.

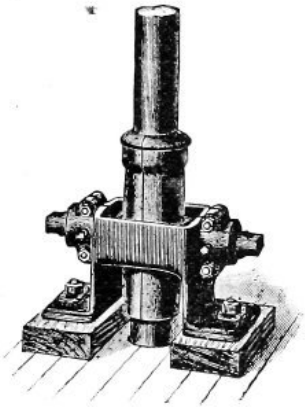


For upright shaft, babbited and provided with grease or oil reservoir at top and arranged with parting cover to prevent accumulation of dirt or grit.

PRICE LIST.

Diam. shaft.	Price.	Diam. shaft.	Price.
$1\frac{7}{16}$	$3.25	$2\frac{11}{16}$	$ 9.00
$1\frac{11}{16}$	3.75	$2\frac{15}{16}$	11.25
$1\frac{15}{16}$	5.00	$3\frac{3}{16}$	13.00
$2\frac{3}{16}$	6.25	$3\frac{7}{16}$	16.00
$2\frac{7}{16}$	7.50	$3\frac{15}{16}$	22.00

ADJUSTABLE BALL AND SOCKET VERTICAL BEARINGS.



In these Bearings the alignment is maintained by means of adjusting plungers with set screws bearing on them.

The Bearing is made with ample provision for lubricating.

PRICE LIST.

Size in inches.	Price.	Size in inches.	Price.
$1\frac{7}{16}$	$ 3.95	$2\frac{15}{16}$	$13.00
$1\frac{11}{16}$	5.00	$3\frac{3}{16}$	15.00
$1\frac{15}{16}$	6.00	$3\frac{7}{16}$	20.00
$2\frac{3}{16}$	7.00	$3\frac{11}{16}$	32.50
$2\frac{7}{16}$	9.00	$3\frac{15}{16}$	40.00
$2\frac{11}{16}$	11.00		

Price List, Shafting.

This List Supersedes All Previous Lists.

Size.	Price per lb.	Weight per ft.	Price per ft.	Size.	Price per lb.	Weight per ft.	Price per ft.	Size.	Price per lb.	Weight per ft.	Price per ft.
3/16	$0.10	.095	$0.01	1 1/8	$0.05 1/2	3.38	$0.19	2 1/8	$0.05	21.15	$1.06
7/32	.10	.130	.02	1 3/16	.05 1/2	3.77	.21	2 2/8	.05	22.09	1.11
1/4	.10	.167	.02	1 2/10	.05 1/2	3.86	.22	2 3/16	.05	23.06	1.16
				1 1/4	.05 1/2	4.17	.23	3	.05	24.05	1.21
5/16	.08 1/2	.260	.02	1 5/16	.05 1/2	4.61	.26				
11/32	.08 1/2	.320	.03	1 3/8	.05 1/2	5.05	.28	3 1/8	.05 1/2	26.09	1.37
				1 13/32	.05 1/2	5.26	.29	3 3/16	.05 1/2	27.16	1.43
3/8	.07	.375	.03	1 7/16	.05 1/2	5.52	.31	3 1/4	.05 1/2	28.22	1.49
13/32	.07	.450	.04					3 3/8	.05 1/2	30.43	1.60
7/16	.07	.511	.04					3 7/16	.05 1/2	31.58	1.66
15/32	.07	.586	.05	1 15/32	.05	5.60	.31				
1/2	.07	.667	.05	1 1/2	.05	6.01	.31				
				1 9/16	.05	6.52	.33	3 1/2	.05 1/2	32.73	1.81
9/16	.06	845	.06	1 5/8	.05	7.06	.36	3 5/8	.05 1/2	35.20	1.94
19/32	.06	1.00	.06	1 11/16	.05	7.61	.39	3 11/16	.05 1/2	36.40	2.01
5/8	.06	1.05	.07	1 3/4	.05	8.18	.41	3 3/4	.05 1/2	37.57	2.07
21/32	.06	1.17	.08	1 13/16	.05	8.78	.44	3 7/8	.05 1/2	39.95	2.20
11/16	.06	1.26	.08	1 7/8	.05	9.39	.47	3 15/16	.05 1/2	41.25	2.27
23/32	.06	1.38	.09	1 15/16	.05	10.03	.51				
				2	.05	10.69	.54	4	.06	42.75	2 57
3/4	.05 1/2	1.50	.09	2 1/16	.05	11.35	.57	4 3/16	.06	47.40	2.85
25/32	.05 1/2	1.77	.10	2 1/8	.05	12.07	.61	4 1/4	.06	48.26	2.90
13/16	.05 1/2	1.90	.11	2 3/16	.05	12.80	.65	4 3/8	.06	51.80	3.11
27/32	.05 1/2	1.94	.11	2 1/4	.05	13.52	.68	4 7/16	.06	52.62	3.16
7/8	.05 1/2	2.05	.12	2 5/16	.05	14 35	.72				
29/32	.05 1/2	2.20	.13	2 3/8	.05	15.07	.76	4 1/2	.06 1/2	54.11	3.52
15/16	.05 1/2	2.35	.13	2 7/16	.05	15.89	.80	4 11/16	.06 1/2	58.66	3 82
31/32	.05 1/2	2.52	.14	2 1/2	.05	16.70	.84	4 3/4	.06 1/2	60.88	3.96
1	.05 1/2	2.68	.15	2 9/16	.05	17.55	.88	4 15/16	.06 1/2	65.50	4.26
1 1/16	.05 1/2	3.02	.17	2 5/8	.05	18.41	.93				
1 3/16	.05 1/2	3.11	.17	2 11/16	.05	19.31	.97	5	.07	67.45	4.72
1 3/32	.05 1/2	3.20	.18	2 3/4	.05	20.21	1.02				

The above prices are for shafts from 1 foot to 24 feet long inclusive.

For shafts 6 to 11¼ inches long, ½ cent per pound net extra.
For shafts 3 to 5¾ inches long, 1 cent per pound net extra.
For shafts shorter than 3 inches, special prices will be quoted.
For shafts over 24 feet long and less than 30 feet ½ cent per pound net extra.
For shafts 30 feet long and less than 35 feet, 1 cent per pound net extra.
For shafts 35 feet long and less than 40 feet, 1½ cents per pound net extra.
For shafts 40 feet long and less than 45 feet, 2 cents per pound net extra.
For shafts 45 feet long and over, 2½ cents per pound net extra.

BOXING AT COST.

JOURNALS ON SHAFTS.

Diameter of shaft	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16
Journals 6 in. long or less, each.	$1 20	1 25	1 30	1 45	1 55	1 75	1 90	2 10	2 30	2 45	2 65	2 80	3 00	3 35	3 80	4 20
Each additional 3 in. or less	$0 27	30	30	30	35	38	41	41	45	45	45	54	66	66	78	90

KEY-SEATING SHAFTS.

Diam. of Shaft	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16	5 3/16	5 7/16	5 11/16	5 15/16
Key-seat for coupling each end	$0 30	40	40	50	60	60	60	80	80	1 00	1 00	1 20	1 20	1 40	1 40	1 70	1 70	2 00	2 00	2 50
Key-seats for pulleys, etc., 11 long or less	$0 60	70	70	80	90	90	90	1 10	1 10	1 30	1 30	1 50	1 50	1 70	1 70	2 20	2 20	2 50	2 50	3 00
For each additional ft. or fraction of a ft.	$0 20	24	24	30	40	40	40	50	50	60	60	70	70	90	90	1 20	1 20	1 50	1 50	2 00
Full length per ft.	$0 20	24	24	30	40	40	40	50	50	60	60	70	70	90	90	1 20	1 20	1 50	1 50	2 00
For each drilled end	$0 30	40	40	50	60	60	60	70	70	80	80	90	90	1 00	1 00	1 10	1 10	1 30	1 30	1 50
Squaring each end	$0 40	50	50	60	70	70	70	80	80	1 00	1 00	1 20	1 20	1 30	1 30	1 50	1 50	1 70	1 70	2 00

LENGTHENING BEARINGS.

Diameter of shaft	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16
Each inch in addition to listed lengths	$0 24	24	30	42	48	50	58	65	70
Diameter of shaft	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16	5 7/16	5 15/16
Each inch in addition to listed lengths	$0 80	90	95	1 00	1 10	1 20	1 25	1 35	1 40

Above prices apply to all hangers, floor stands and pillow blocks.

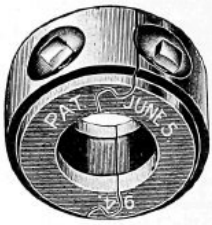
HAMMERING AND BORING BABBITTED BEARINGS

OF HANGERS, FLOOR STANDS AND PILLOW BLOCKS.

Diameter of shaft	1 3/16	1 7/16	1 11/16	1 15/16	2 3/16	2 7/16	2 11/16	2 15/16	3 3/16
Price per bearing	$1 10	1 20	1 30	1 40	1 60	1 80	2 10	2 40	2 80
Diameter of shaft	3 7/16	3 11/16	3 15/16	4 3/16	4 7/16	4 11/16	4 15/16	5 7/16	5 15/16
Price per bearing	$3 30	3 80	4 30	4 80	5 30	5 80	6 30	6 80	7 30

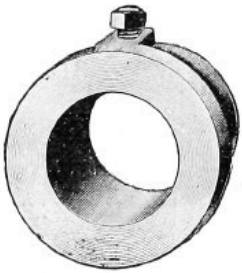
PATENT SAFETY COLLARS.

SOLID.



SPLIT.

COMMON COLLARS.

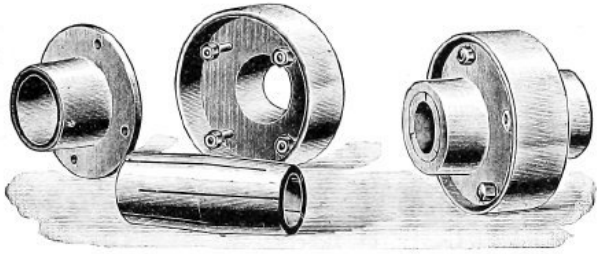


STANDARD PRICE LIST OF SET COLLARS.

SIZE.	PRICE EACH.	SIZE.	PRICE EACH.	SIZE.	PRICE EACH.	SIZE.	PRICE EACH.
15/16	62	3 1/8	$2 63	5 3/16	$6 55	7 1/16	$12 22
1	65	3 3/16	2 70	5 1/4	6 71	7 1/8	12 48
1 1/16	75	3 1/4	2 77	5 5/16	6 87	7 3/16	12 75
1 3/16	80	3 3/8	2 92	5 3/8	7 03	7 1/4	13 00
1 1/4	85	3 7/16	3 00	5 7/16	7 20	7 5/16	13 28
1 5/16	90	3 1/2	3 08	5 1/2	7 37	7 3/8	13 53
1 3/8	95	3 9/16	3 14	5 9/16	7 55	7 7/16	13 80
1 7/16	$1 00	3 5/8	3 22	5 5/8	7 72	7 1/2	14 06
1 1/2	1 05	3 11/16	3 30	5 11/16	7 90	7 9/16	14 32
1 9/16	1 10	3 3/4	3 37	5 3/4	8 08	7 5/8	14 58
1 5/8	1 15	3 13/16	3 45	5 13/16	8 25	7 11/16	14 85
1 11/16	1 20	3 7/8	3 52	5 7/8	8 42	7 3/4	15 10
1 3/4	1 25	3 15/16	3 60	5 15/16	8 60	7 13/16	15 30
1 13/16	1 30	4	3 75	6	8 78	7 7/8	15 63
1 7/8	1 35	4 1/8	4 00	6 1/16	8 97	7 15/16	15 90
1 15/16	1 40	4 3/16	4 15	6 1/8	9 16	8	16 18
2	1 45	4 1/4	4 28	6 3/16	9 35	8 1/16	16 46
2 1/8	1 55	4 5/16	4 42	6 1/4	9 53	8 1/8	16 74
2 3/16	1 60	4 3/8	4 56	6 5/16	9 72	8 3/16	17 02
2 1/4	1 65	4 7/16	4 70	6 3/8	9 91	8 1/4	17 30
2 3/8	1 75	4 1/2	4 85	6 7/16	10 10	8 5/16	17 58
2 7/8	1 80	4 5/8	5 15	6 1/2	10 30	8 3/8	17 86
2 1/2	1 88	4 11/16	5 30	6 9/16	10 50	8 7/16	18 15
2 5/8	2 03	4 3/4	5 45	6 5/8	10 70	8 1/2	18 43
2 11/16	2 10	4 13/16	5 60	6 11/16	10 90	8 3/4	19 56
2 3/4	2 17	4 7/8	5 75	6 3/4	11 10	9	20 70
2 13/16	2 25	4 15/16	5 90	6 13/16	11 30	9 1/4	21 90
2 7/8	2 32	5	6 06	6 7/8	11 50	9 1/2	23 12
2 15/16	2 40	5 1/8	6 22	6 15/16	11 70	9 3/4	24 42
3	2 48	5 1/8	6 38	7	11 96	10	25 75

For prices of Split Collars add 50 per cent. to list price.

PATENT COMPRESSION FLANGE COUPLING.



ADVANTAGES.

Keys are done away with.

Key seating is done away with.

Shafts do not need to be centered, even if there be slight variation in diameters.

Couplings do not need to be faced.

A lack of alignment becomes evident at once.

A gripping power is obtained that will break the shaft before slippage takes place.

There is an equally distributed bearing over the entire surface covered by the coupling.

Clothing and belting are not liable to be caught.

Shafts of different diameters may be united (with reduction couplings) without any cutting down.

PRICE LIST.

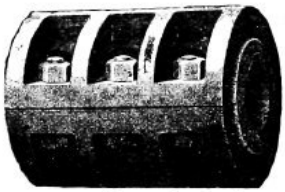
Regular.

Size, inches	$1\frac{3}{16}$	$1\frac{5}{16}$	$1\frac{7}{16}$	$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$
Price	$4 75	$5 00	$5 50	$6 25	$8 00	$9 00	$10 75	$13 00
Size, inches	$2\frac{15}{16}$	$3\frac{3}{16}$	$3\frac{7}{16}$	$3\frac{15}{16}$	$4\frac{7}{16}$	$4\frac{15}{16}$	$5\frac{7}{16}$	$5\frac{15}{16}$
Price	$27 25	$32 50	$39 25	$51 25	$71 25	$94 00	$111 00	$130 00

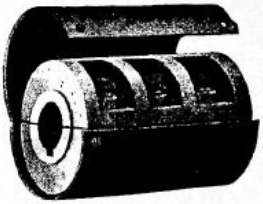
Couplings $2\frac{15}{16}$ and larger constructed with four flanges.

Reducing Couplings. Advance 10 per cent. on above prices. The larger shaft which the coupling fits determines the size.

COMPRESSION COUPLINGS.



Compression Coupling.



Compression Coupling, with Shell.

IMPROVED COMPRESSION COUPLINGS.

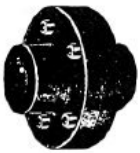
For Reducing Compression Couplings use the List of Coupling of size of largest end.

Diameter of shaft	1⅜	1⅞	1 11/16	1 15/16	2⅜	2⅞	2 11/16	2 15/16	3⅜	3⅞	3 11/16	3 15/16	4⅜	4⅞	4 11/16	4 15/16
Price, not fitted	$3.60	4.20	4.90	5.60	7.50	8.75	10.50	12.25	14.00	15.50	17.75	23.25	26.00	31.00	35.50	42.00
Price, fitted	$5.20	5.80	6.50	7.20	9.90	12.00	14.00	16.25	18.75	20.00	23.40	29.25	32.00	39.00	43.50	52.00

COMPRESSION COUPLINGS—WITH SHELL.

Diameter of shaft	1⅜	1⅞	1 11/16	1 15/16	2⅜	2⅞	2 11/16	2 15/16	3⅜	3⅞	3 11/16	3 15/16
Price, not fitted	$5.80	6.40	7.90	8.90	10.80	12.00	14.90	18.25	22.50	26.00	30.75	37.25
Price, fitted	$7.40	8.00	9.50	10.75	13.20	15.25	18.40	22.85	27.25	31.00	36.40	43.00

Intermediate sizes at proportionate prices. All sizes from 2⅞ inches up are provided with a key and steel pins without extra charge; the smaller sizes do not require keys.

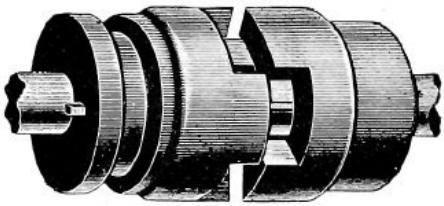


FLANGED FACE COUPLINGS.

Diameter of shaft	1⅜	1⅞	1 11/16	1 15/16	2⅜	2⅞	2 11/16	2 15/16	3⅜	3⅞	3 11/16	3 15/16	4⅜	4⅞	4 11/16	4 15/16	5⅞	5 15/16
Price, not fitted	$6.50	7.25	8.50	9.50	10.75	12.75	14.75	16.75	18.75	22.25	27.25	31.00	34.00	39.50	46.50	57.50	69.00	87.00
Price, fitted to shaft	$9.00	10.10	11.70	13.50	14.75	17.50	19.50	22.75	24.75	29.00	34.00	39.00	42.00	49.50	56.50	71.50	84.00	105.00
For turned bolts and reamed holes, add	$0.60	.85	.85	1.00	1.00	1.50	1.50	1.90	1.90	2.20	2.20	2.60	2.60	3.20	3.20	3.20	3.30	3.30
If turned all over—with turned bolts, etc.—add	$4.00	4.40	4.80	5.50	5.80	6.75	7.15	7.90	8.40	9.10	9.45	10.50	11.40	12.80	13.70	14.60	15.30	16.20

Intermediate sizes, proportionate prices. For Reducing Flange Couplings take one-half of Combined list prices of the two sizes required.

JAW CLUTCHES AND JAW CLUTCH COUPLINGS.



Square-Jaw Clutch Coupling.

Spiral-Jaw Clutch Coupling.

These clutches are made with either square or spiral jaws.

The spiral jaws are either right hand or left hand. The spiral clutch shown in cut is a right-hand clutch.

We will furnish pulleys, sprocket wheels and gears cast with clutch hubs when so wanted. Always state whether wheel or clutch is to drive, and send rough sketch showing arrangement of clutch and direction shaft revolves

PRICE LIST.

Subject to Discount.

No.	Size.	Clutch.	Clutch Coupling.	No.	Size.	Clutch.	Clutch Coupling.
3	1 5/16	$2 25	$ 4 30	7½	3 3/16	$ 9 45	$18 20
3½	1 3/16	2 85	5 50	8	3 7/16	10 50	20 20
4	1 7/16	3 50	6 80	8½	3 11/16	11 60	22 30
4½	1 11/16	4 20	8 10	9	3 15/16	12 75	24 50
5	1 15/16	4 95	9 60	10	4 7/16	15 20	29 30
5½	2 3/16	5 75	11 10	11	4 11/16	17 85	34 50
6	2 7/16	6 60	12 80	12	5 7/16	20 70	40 00
6½	2 11/16	7 50	14 50	13	5 15/16	23 75	46 00
7	2 15/16	8 45	16 30				

ROPE DRIVE SHEAVES—WHOLE.

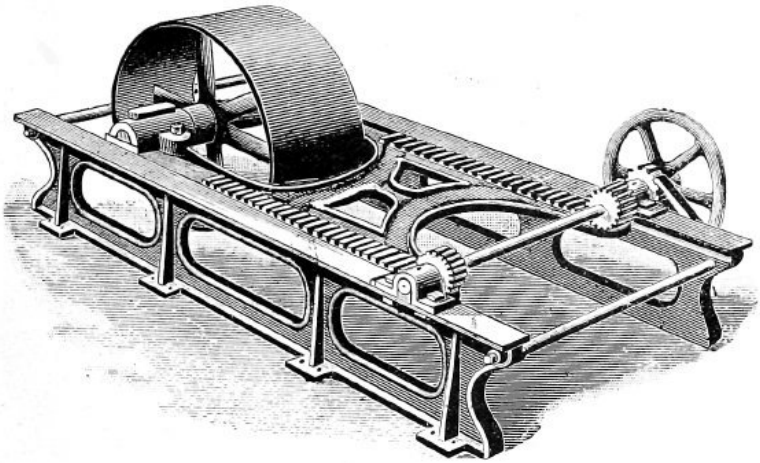
FOR MANILA ROPE TRANSMISSION.

TURNED, BORED, AND KEY-SEATED OR SET SCREWED.

For Split Sheaves see additional Split List.

Diameter.	Grooves.	PRICE. ¾ to 1 inch Rope.	1⅛ to 1¼ inch Rope.	1⅜ to 1½ inch Rope.
12	1	$ 9 10	$10 60	$12 30
	2	12 20	14 50	16 60
	3	15 30	18 10	20 80
	4	18 40	21 90	25 00
	5	21 20	25 10	29 10
	6	24 10	28 60	33 20
	7	27 00	32 10	37 30
	8	29 90	35 60	41 40
	9	32 80	39 00	45 50
	10	35 70	42 50	49 60
	11	38 70	46 00	54 40
	12	41 70	49 60	59 20
14	1	10 00	11 80	13 60
	2	13 50	16 10	18 40
	3	17 00	20 20	23 30
	4	20 50	24 30	28 20
	5	24 00	28 40	33 00
	6	27 30	32 50	37 80
	7	30 60	36 60	42 60
	8	33 90	40 70	47 40
	9	37 20	44 80	52 10
	10	40 50	49 00	56 80
	11	44 30	53 10	61 60
	12	48 10	57 20	66 50
16	1	11 00	13 00	14 90
	2	14 90	17 60	20 30
	3	18 80	22 30	25 70
	4	22 70	26 90	31 10
	5	26 60	31 50	36 50
	6	30 60	36 20	42 00
	7	34 60	40 90	47 50
	8	38 60	45 60	53 00
	9	42 60	50 30	58 50
	10	46 60	54 90	64 00
	11	50 50	59 70	69 50
	12	54 40	64 50	75 00
18	1	12 00	14 20	16 30
	2	16 50	19 20	22 20
	3	21 00	24 50	28 40
	4	25 50	29 80	34 60
	5	30 00	35 10	40 80
	6	34 50	40 40	47 10
	7	39 00	45 90	53 40
	8	43 50	51 30	59 70
	9	48 00	56 70	65 90
	10	52 50	62 00	72 00
	11	57 00	67 50	78 25
	12	61 50	73 00	84 50
20	1	13 00	15 40	17 70
	2	18 00	20 80	24 10
	3	23 00	26 80	31 10
	4	28 00	32 70	38 00
	5	33 00	38 70	44 90
	6	37 80	44 50	51 70
	7	42 60	50 30	58 50
	8	47 40	56 10	65 20
20	9	52 20	61 90	71 90
	10	57 00	67 70	78 60
	11	62 50	74 60	86 30
	12	68 00	81 40	94 00
	13	73 50	88 20	101 70
	14	79 00	95 00	109 40
	15	84 50	101 80	117 00
	16	90 50	108 70	125 40
	17	96 50	115 60	133 80
	18	102 50	122 40	142 20
	19	108 50	129 20	150 60
	20	114 50	136 00	159 00
22	1	14 10	16 60	19 10
	2	19 20	22 50	26 00
	3	24 30	28 70	33 40
	4	29 40	34 90	40 70
	5	34 50	41 10	48 00
	6	39 70	47 00	55 00
	7	44 90	52 50	62 00
	8	50 10	58 80	69 00
	9	55 30	64 70	76 00
	10	60 50	70 50	83 20
	11	66 10	77 70	91 20
	12	71 70	84 90	99 20
	13	77 30	92 10	107 20
	14	82 90	99 30	115 10
	15	88 50	106 50	123 00
	16	94 90	113 80	132 20
	17	101 30	121 10	141 40
	18	107 70	128 30	150 60
	19	114 10	135 50	159 80
	20	120 70	142 70	169 00
24	1	15 20	17 80	20 50
	2	20 90	24 20	27 90
	3	26 60	30 70	35 60
	4	32 30	37 20	43 80
	5	38 00	43 70	50 80
	6	43 30	50 30	58 50
	7	48 60	56 90	66 10
	8	53 90	63 50	73 70
	9	59 20	70 00	81 30
	10	64 50	76 40	88 90
	11	70 40	83 60	97 30
	12	76 30	90 80	105 70
	13	82 20	98 00	114 10
	14	88 10	105 10	122 40
	15	94 00	112 20	130 60
	16	100 40	120 00	140 50
	17	106 80	127 80	150 40
	18	113 20	135 60	160 30
	19	119 60	143 30	170 20
	20	126 00	151 00	180 00
26	1	16 30	19 10	22 10
	2	22 20	25 90	29 90
	3	28 10	33 00	38 00
	4	34 00	40 10	46 10
	5	39 90	47 20	54 20
26	6	45 70	54 20	62 50
	7	51 50	61 20	70 80
	8	57 30	68 20	79 10
	9	63 10	75 10	87 30
	10	68 90	81 90	95 50
	11	75 30	89 70	104 60
	12	81 70	97 50	113 70
	13	88 10	105 20	122 80
	14	94 50	112 90	131 80
	15	100 90	120 60	140 80
	16	107 70	129 10	150 90
	17	114 50	137 60	161 00
	18	121 30	146 10	171 00
	19	128 10	154 60	181 00
	20	134 90	163 00	191 00
28	1	17 40	20 40	23 70
	2	23 40	27 60	31 90
	3	29 40	35 00	40 60
	4	35 40	42 40	49 20
	5	41 40	49 80	58 00
	6	48 00	57 30	66 60
	7	54 40	64 80	75 20
	8	60 40	72 30	83 80
	9	66 80	79 80	92 40
	10	73 20	87 20	101 00
	11	80 00	95 60	111 20
	12	86 80	104 00	121 40
	13	93 60	112 30	131 50
	14	100 40	120 60	141 60
	15	107 20	128 90	151 60
	16	114 90	138 30	162 50
	17	122 60	147 60	173 40
	18	130 30	156 90	184 30
	19	138 00	166 20	195 20
	20	145 70	175 50	206 00
30	1	18 50	21 70	25 30
	2	24 90	29 30	34 00
	3	31 30	37 10	43 30
	4	37 70	44 90	52 50
	5	44 10	52 80	61 70
	6	50 70	60 70	70 90
	7	57 30	68 60	80 10
	8	63 90	76 50	89 20
	9	70 50	84 40	98 30
	10	77 10	92 30	107 30
	11	84 60	101 40	118 30
	12	92 10	110 50	129 30
	13	99 60	119 50	140 20
	14	107 10	128 50	151 10
	15	114 60	137 60	162 00
	16	122 80	147 60	173 30
	17	131 00	157 60	185 60
	18	139 20	167 60	197 40
	19	147 40	177 60	209 20
	20	155 60	187 50	221 00

HORIZONTAL BELT TIGHTENERS.



We make the horizontal tightener with iron frame as shown.

Our tighteners are substantial and well proportioned. The pulleys are well balanced.

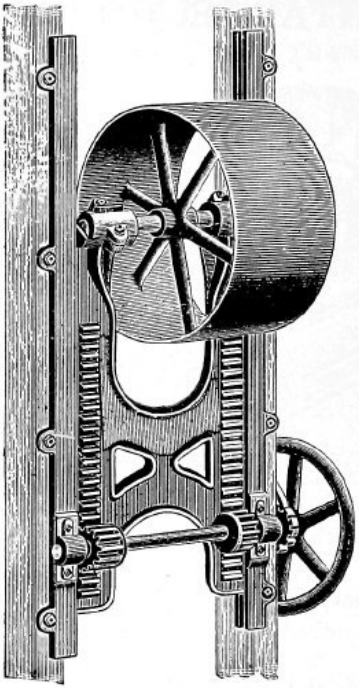
We can furnish tighteners with pulleys having diameters and faces different from our standard sizes given below.

PRICE LIST OF HORIZONTAL BELT TIGHTENER.

Subject to Discount.

No.	Length of Adjustment.	Size of Pulley. Diam. × Face.	Diameter of Shaft.	Price.
00	1½ feet	12 × 9	$1\frac{7}{16}$	$ 37 50
0	1⅔ "	18 × 12	$1\frac{11}{16}$	50 00
1	2 "	24 × 14	$1\frac{15}{16}$	70 00
2	3⅓ "	28 × 20	$2\frac{7}{16}$	100 00
3	4 "	30 × 26	$2\frac{11}{16}$	160 00
4	5 "	42 × 38	$2\frac{15}{16}$	300 00

We supply belt tighteners of special design for extra-heavy work. Prices upon application.



Our vertical belt tighteners are made with guides and all ironwork ready to be attached to wooden uprights.

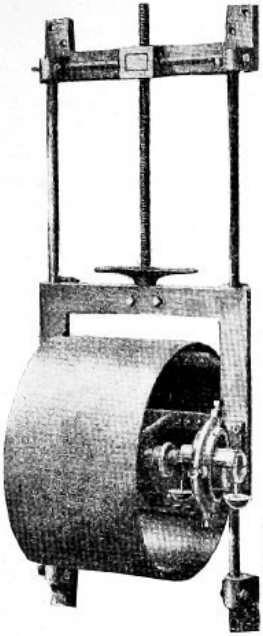
We can furnish tighteners with pulleys having diameters and faces different from our standard sizes given below.

PRICE LIST OF VERTICAL BELT TIGHTENER.

Subject to Discount.

No	Length of Adjustment.	Size of Pulley. Diam.	Face.	Diameter of Shaft.	Price.
00	1½ feet	12 ×	9	$1\frac{7}{16}$	$ 30 00
0	1⅔ "	18 ×	12	$1\frac{11}{16}$	40 00
1	2 "	24 ×	14	$1\frac{15}{16}$	56 00
2	3½ "	28 ×	20	$2\frac{7}{16}$	82 00
3	4 "	30 ×	26	$2\frac{11}{16}$	120 00
4	5 "	42 ×	38	$2\frac{15}{16}$	250 00

We supply belt tighteners of special design for extra-heavy work. Prices upon application.



SLIDING BELT TIGHTENER.

Iron Frame, Adjustable—Complete with Double-Belt Pulley and Self-Oiling Babbitted Bearings.

These tighteners are very simply and substantially constructed and are positive in action. They are supplied with self-oiling adjustable bearings, and are capable of the very nicest adjustment, as by using the adjusting screws which hold the boxes, the belt can be made to run exactly in the center of the pulley.

We are prepared to furnish tighteners similar to our cut No. 38, except that they would be provided with flanges and guy rods by which they could be set vertically on floor or suspended from ceiling.

Number	1	2	3	4	5	6	7	8
Size of pulley	12x9	14x11	18x13	20x17	24x21	30x25	36x31	40x37
Distance between uprights, in.	12	14	16	20	24	28	34	40
Length of adjustment,	20	22	24	26	30	34	40	46
Price	$49 00	54 00	70 00	80 00	112 00	145 00	197 00	270 00

Slight extra charge for variation in distance between uprights, and in length of adjustment

SWINGING BELT TIGHTENER.

Iron Frame—Complete with Double-Belt Pulley and Adjustable Self-Oiling Bearings.

These Tighteners are furnished with a yoke which holds the boxes, and which permits of the pulley being accurately adjusted in any direction.

Width of belt, inches..	4	6	8	10	12	16	20	24
Size of pulley	10x5	10x7	12x9	14x11	18x13	20x17	24x21	30x25
Length of frame, 3 feet	$29 00	30 00	36 00	40 00	53 00	65 00	88 00	120 00
Length of frame, 4 feet	$31 00	32 00	39 00	43 00	57 00	69 00	95 00	127 00
Length of frame, 5 feet	$33 00	34 00	42 00	46 00	61 00	73 00	102 00	134 00
Length of frame, 6 feet	$35 00	36 00	45 00	49 00	86 00	77 00	109 00	141 00

PRICE LIST OF STANDARD DETACHABLE LINK CHAIN BELTING

The numbers marked o. s. (odd sizes) are those for which Sprocket Wheels are not made except to special order. See pages and for Speed Table and other information pertaining to chain and sprockets.

No.		PRICE PER FOOT			Price Couplers per pair	Approximate Links in 10 Feet	Maximum Power in Lbs.	Breaking Strain in Lbs.
		All Plain Links	All Attachment Links	With Attachments Interspersed				
21	o.s.	.24	.....	.....	.....	192	80	.....
23	o.s.	.18	.....	.....	.....	185	65	.....
024		.16	.38	.24	.....	133	50	.....
025	o.s.	.12	.28	.17	.....	120	75	.....
25		.12	.28	.17	.06	133	75	700
32		.12	.25	.17	.06	104	150	1100
33		.12	.25	.17	.07	86	200	1190
34		.12	.25	.17	.08	86	225	1300
34½	o.s.	.12	.....	.....	.....	103	250	.....
35		.12	.25	.17	.08	74	250	1200
36½	o.s.	.13	.....	.....	.....	80	250	.....
37	o.s.	.13	.28	.....	.....	60	225	.....
38	o.s.	.13	.28	.....	.....	60	250	.....
39	o.s.	.30	.53	.38	.....	75	300	.....
042		.18	.30	.22	.....	88	300	.....
42		.13	.27	.18	.11	88	300	1500
43	o.s.	.28	.45	.34	.....	79	400	.....
44	o.s.	.13	.27	.....	.....	80	325	.....
45		.13	.27	.18	.11	74	350	1600
47		.16	.30	.....	.....	74	400	.....
48	o.s.	.15	.28	.....	.....	60	375	.....
50		.17	.30	.....	.....	87	350	.....
50	32/25	.17	.....	.....	.....	94	200	.....
051		.24	.....	.....	.....	104	375	.....
51		.17	.30	.22	.12	104	375	1900
052		.22	.....	.....	.....	80	525	.....
52		.18	.30	.22	.12	80	500	2300
52½		.24	.....	.....	.16	79	550	.....
53	o.s.	.18	.30	.22	.....	91	500	.....
54	o.s.	.18	.....	.....	.....	82	475	.....
055		.22	.....	.....	.....	74	525	.....
55		.18	.28	.21	.12	74	450	2200
056		.22	.....	.....	.....	80	600	.....
057		.22	.36	.....	.....	74	450	.....
57		.18	.36	.24	.17	52	600	2800
58	o.s.	.22	.....	.....	.....	75	550	.....
62		.24	.41	.30	.18	73	650	3100
62½		.24	.41	.30	.....	73	650	.....
64	o.s.	.24	.....	.....	.....	60	550	.....
J64		.30	.....	.....	.....	79	650	.....
65	o.s.	.24	.41	.....	.....	56	550	.....
66		.24	.41	.30	.18	60	700	2600
67		.24	.41	.30	.18	52	700	3700
71		.30	.....	.....	.....	72	925	.....

PRICE LIST OF STANDARD DETACHABLE LINK CHAIN BELTING— Continued

No.	PRICE PER FOOT			Price Couplers per pair	Approximate Links in 10 Feet	Maximum Power in Lbs.	Breaking Strain in Lbs.
	All Plain Links	All Attachment Links	With Attachments Interspersed				
71½ o.s.	.30	.....	.....	.....	60	900	.....
072	.30	.....	.....	.....	72	900	.....
072½	.30	.....	.....	.....	72	925	.....
72	.30	.....	.....	.....	59	850	.....
72½	.30	.....	.....	.....	72	925	.....
75	.28	.45	.34	.21	46	750	4000
76 o.s.	.30	.....	.....	.....	52	625	.....
76½ o.s.	.30	.....	.....	.....	58	700	.....
77	.28	.45	.34	.21	52	800	3600
78	.32	.56	.40	.28	46	1000	4900
83	.36	.67	.53	.37	30	1200	4950
85	.40	.70	.54	.50	30	1300	7600
88	.38	.68	.53	.32	46	1200	5700
88½	.50	.70	.60	.35	46	1600	8700
89 o.s.	.50	.....	.....	.....	46	1300	.....
93 o.s.	.45	.70	.56	.50	30	1600	7500
94	.60	.98	.77	.....	30	1800	.....
95	.48	.90	.68	.60	30	1600	8700
101 o.s.	.50	.85	.70	.....	45	1600	.....
103	.60	.90	.75	.66	40	1800	9600
105	.54	.75	.65	.....	20	1500	.....
106 o.s.	.67	.....	.....	.....	20	2000	.....
108	.60	1.00	.82	.90	25½	2000	9900
110	.75	1.20	.98	1.05	25½	2000	12700
114	.75	.96	.87	.96	36½	2000	11000
115 o.s.	1.00	.....	.....	.....	37	2050	.....
116½ o.s.	1.00	.....	.....	.....	37	2100	.....
117 o.s.	1.00	.....	.....	.....	37	2150	.....
118 o.s.	1.00	.....	.....	.....	37	2200	.....
122	.90	1.40	1.15	1.80	20	2200	15000
124	.90	1.50	1.20	1.35	30	2200	12700
130 o.s.	1.35	.....	.....	1.80	34	2500	.....
146	.90	1.40	1.15	.....	20	2800	14000
160	1.25	1.80	1.50	.....	12	4000	.....
HHK1 o.s.	1.00	.....	.....	.....	34	2100	.....
HHK2 o.s.	1.35	.....	.....	.....	34	2500	.....

The prices for Attachments are for A^1, A^2, A^3, C^1, E^1, F^2, G^1, G^6, H^1, H^2, K^1, K^2, M^1, M^3, S^1 and S^2, and as they are now made for the respective chains. Other Attachments will be furnished at special prices.

REGULAR LIST OF ATTACHMENTS

The prices of attachments are for A¹, A², A³, C¹, E¹, F², G¹, G⁶, H¹, H², K¹, K², M¹, M³, S¹ and S², and as they are now made for the respective chains. Other attachments will be furnished at special prices.

No. 025	No. 25	No. 32	No. 33	No. 34	No. 35	No. 37	No. 38	No. 39	No. 042	No. 42	No. 43	No. 44	No. 45	No. 45½	No. 47	No. 48	No. 50	No. 51	No. 052	No. 52	No. 52½	No. 53	No. 55	No. 057	No. 57	No. 59	No. 62	No. 65	No. 66	No. 67	No. 75	No. 77	No. 78	No. 83	No. 85	No. 88
A3	A3	A1	A1	A1	A1	K5	A3	L3	A1	A1	K3	A3	A1	C1	L2	A3	A1	A1	cplr	A1	cplr	C1	A1	G26	A1	A23	A1	B1	C1	A1	C4	A1	A1	D5	A4	A3
K1	A9	A2	A3	C1	A2	L3	C1		L2	A1	cplr	K1	A3	C12	L3	A4	A3	C14		A3		E1	A2	L3	A3		A1	B2	E4	A7	E1	E1	A3	E1	E2	A7
	C¼	A3	A6	C2	A10	S1	D1			A1c	K5	K1	A10		L4	B1	K3½	D4		A17		S1	A3	L4	C4		cplr	U1	I ¹	A11	F2	F2	A7	G1	F1	A28
	C½	A12	A13	C6	A13		D6			A1d	K6	Cplr	A12			B2		I ⁵		C1		cplr	A15		D5		A3		R18	D5	H1	G1	A11	G6	F2	E1
	C1	A13	A14	C15	A14		E1			A3	Cplr		A13			D1		I ⁶		C4			A20		E1		A4		cplr	E1	H2	G5	A16	M3	F5	F1
	C4	A18	C1	C16	A20		Plain			A6			A14			I ²		K1		D3			A41		E7		A5			F2	H3	G6	D5	M4	G6	F2
	C5	A19	D3	C21	C1					A15			A15			K1		K5		D4			C1		F2		A12			G1	H4	H1	E1	cplr	H1	F4
	C11	C1	D33	E1	D7					C1			A20					K7		D5			C5		F9		C1			H1	K1	H9	F2		K2	F5
	C14	C5	E1	K1	D9					D3			A26					S1		D12			C8		G11		C5			K1	K1	K1	F4		K4	F6
	D3	C10	EM1	K6	E1					E1			A27	No						E1			D3		H1		C8			K C	K2	K8	G1		K7	F8
	D15	D3	EM2	cplr	K1					I ¹³			A Strp	45 con						F2			D6		H2		D5			L5	R8	L2	G6		M3	F12
	E1	E1	I ³		K5					I ¹⁵			C1	K40						G1			E1		K1		E4			R7	cplr	R1	H1		S2	F14
	Estd	EK	I ⁵		L1					K1			C6	KC						K1			F2		K1		E5			S2	Sepr	R3	H2		cplr	G1
	E5	G1	K1		S1					K3			C9	L2						K5			G2		cplr		G11			EM		S2	H6		Sepr	G6
	G1	I²	K3		cplr	Scraper No. 1				K3½			C15	L3						R10			G27		L9		J1			DD		cplr	K1		Hod	G8
	H2	I⁴	K5							K5			C20	M1						R20			K1		S2		K1			cplr			K3			G10
	I³	K1	K6							K6			C22	M4						S1			K5		S8		K5						M3			G12
	IK	K3	K11							K10			C28	M7						Cplr			K10	No.	Tube		K18						R1			H 1
	K1	K5	K12							L6			D1	M8						Switch	Socket		K13	55	Cplr		Cplr						R8			H 2
	K5	K6	K13							M 2			D3	M9									K17	con						No.			R20			H 5
	K6	L1	L2							M 5			D5	P4									K C	S1						71			S2			H 6
	L2	L2	M1							S1			D6	P 4½									L2	S5						K1			cplr			H 9
	M1	M 1	S1							S3			D10	S1									M1	Cplr												K 1
	M5	S9	cplr							cplr			E1	S4									M5													M 3
	R4	U1								Rake Teeth, Rake Head.			E4	S5																							R 1
	R6	cplr											E12	S6																					R 2
	R9												F2	Sepr																					R 8
	R10												G1	No1																					R13
	R11												G2	Sepr																					R30
	R12												G 27	No2																					S2
	R14												H2	Sepr																					S7
	R15												I³	No3																					cplr
	R16												I¹²	Sepr																					
	R26												I¹⁵	No6																					
	S1												K1	Cplr																					88½
	S9												K3	Tube																					,K1
	U												K5	40																					cplr
	cplr												K10	Spee																					
	cup																																		

No. 93	No. 94	No. 95	No. 101	No. 103	No. 103	No. 105	No. 106	No. 108	No 114	No. 122	No. 124	No. 146	No. 160
G1	F1	F2	G6	A1	F8	F1	K2	F2	A11	F2	A4	E2	K2
	K1	H1		A4	G6	H2		F3	D D	K2	A11	F2	
	K2	K2		A5	G10	H4		G1	F8	Cplr	D5	F5	
	cplr	cplr		A11	H1	K2		G6	K1		F2	K2	
				A22	H2	K4		K2	cplr		F8	K4	
				A24	H3	M 3		K3			G1		
				D5	K1			cplr			G6		
				D D	K8			Hod			K1		
				E1	K19	No. 103		No 110			M3	No. 130	
				E5	M1		cplr	K2			cplr	cplr	
				F2	M3			cplr					
				F3	R1								

Please take notice that attachments are only made as shown in this table for the different sizes.

Some attachments are made only to order at extra cost and are not kept in stock.

PARTIAL LIST OF ATTACHMENT LINKS, PRICE PER FOOT, NOT INCLUDED IN REGULAR PRICE LIST ON PAGE 692.

No. 25

D3	$0.40
D8	.40
D15	.40
K5	.30
K6	.35
R4	.40
R26	.40
S9	.40

No. 32

D3	.40
I-3	.40
K3	.35
K5	.30
K6	.35
S9	.40

No. 33

A14	.40
D3	.40
I-3	.40
K3	.35
K5	.30
K6	.35

No. 34

K6	.35

No. 35

K5	.30
Scraper No.1	....

No. 42

A14	.35
A15	.35
K3	.35
K3½	.35
K5	.30
K6	.35
L6	.65
A1 Coupler per pair	.15
Rake Head	....
" Tooth	....

No. 45

A14	$0.35
A15	.35
C15	.40
C20	.40
C22	.60
C28	.40
D3	.35
D5	.35
I-3	.40
I-12	.40
K3	.35
K5	.30
K40	.40
P4	.40
S6	.40
Scraper No.1	.40
" " 2	....
" " 3	....
" " 6	....
Tube	....
40 Special	....

No. 48

C29	.35

No. 51

A1	.30
I-5	.35
K1	.30
K5	.35
S1	.30

No. 52

A14	.40
D3	.35
D5	.36
K5	.30
Socket	....
Swivel	....

No. 55

C5	.35
C8	.35
D3	.35
G27	.35
K5	.30

No. 57

D5	.45

No. 057

L4	$0.40

No. 62

A12	.40
C8	.50
D5	.45
K5	.45
A1 Coupler	....

No. 67

D5	.45

No. 75

C4	.45
H3	.50
R1	.39
R8	.40
Scraper	....

No. 77

H9	.48
R1	.30
R3	.30

No. 78

D5	.65
F4	.65
H6	1.50
K3	.65
K6	.80
R1	.40
R8	.50

No. 85

F5	.80
Scraper	....
Hod	....

No. 88

F4	$0.70
F8	.80
F12	.80
F14	.80
G10	.90
H6	1.50
R1	.45
R8	.55

No. 103

F3	1.00
F8	1.10
H3	1.00
R1	.70

No. 108

K3	1.30

No. 114

F8	1.20

No. 124

F8	1.70

No. 146

F5	1.60
K4	1.60

OUR SPEED TABLE

Is based on the rule for computing horse power. In applying this rule the effective pull on the chain should be taken at about 60 per cent of the working strain, to allow for friction and other losses.

SIZE No.		APPROXIMATE HORSE POWER DEVELOPED			
		Working Strain	Approximate in Leather Belting	SPEED IN 100	100
024	Odd size	50 lbs.		.14	.21
25		75	1 in single	.21	.42
025	Use No. 25 wheels	75		.22	.42
32		150	1½ in. single	.36	.75
33		200	2 in. single	.45	.85
34		225	2½ in. single	.45	.85
35		250	2½ in. single	.50	.93
36½	Odd size. Use No. 52 wheels	250	2½ in. single	.50	.93
37	Odd size	225		.47	.85
38	Odd size	250		.45	.95
39	4 bars; 3 hooks	300		.55	1.
042	Use No. 42 wheels	300		.55	1.10
42		300	3 in. single	.55	1.
43	3 bars; 2 hooks	400		.75	1.45
44	Odd size. Use No. 52 wheels	325		.58	1.10
45		350	3½ in. single	.60	1.15
45½	Use No. 45 wheels	250		.45	.95
47	Use No. 45 wheels	400		.72	1.50
48	Odd size	375		.60	1.30
50	Use No. 42 wheels	350		.60	1.20
51		375	3½ in. single	.65	1.35
52		500	4 in. single	.83	1.65
052	Use No. 52 wheels	525		.90	1.85
52½	Use No. 52 wheels	550		.95	2.
54	Odd size	475		.80	1.55
055	Odd size	525		.95	1.90
55		450	4 in. single	.75	1.55
056	Use No. 52 wheels	600		1.05	2.
057	Use No. 55 wheels	450		.80	1.50
57		600	6 in. single	1.05	2.
58	Odd size	550		1.	**1.90**
62		650	6¼ in. single	1.15	**2.10**
64	Odd size	550		.95	**1.90**
063	Use No. 52 wheels	650		1.15	2.10
65	Odd size	550		1.	**1.90**
66		700	6½ in. single	1.25	2.45
67		700	7 in. single	1.35	2.60
71	Use No. 62 wheels	925		1.75	3.50
71½	Odd size	900		1.75	3.45
072	Use No. 62 wheels	900		1.75	3.45
72	Use No. 66 wheels	850		1.65	3.25
72½	Use No. 62 wheels	925		1.85	3.70
75		750	7½ in. single	1.45	2.85
76	Odd size	625		1.15	2.25
76½	Odd size	700		1.35	2.65
77		800	8 in. single	1.55	3.05
78		1000	10 in. single	1.80	**3.60**
83		1200	12 in. single	2.05	**4.10**
85		1300	9 in. double	2.10	4.15
88		1200	8 in. double	2.05	4.05
88½	Use No. 88 wheels	1600		3.	6.
89	Odd size	1300		2.05	4.15
93	Odd size	1600		3.05	6.
94	Use No. 85 wheels	1800		3.55	7.05
95		1600	10 in. double	2.95	6.05
101	Odd size	1600		3.05	**6.05**
103		1800	12 in. double	3.55	7.10
105		1500	10 in. double	2.80	5.75
106		2000	11 in. double	4.	**8.05**
108		2000	13 in. double	3.95	8.
114		2000	13 in. double	4.05	8.10
115	Odd size	2050		4.15	**8.35**
117	Odd size	2150		4.40	**8.75**
118	Odd size	2200		4.45	**8.75**
122		2200	15 in. double	4.60	**9.05**
124		2200	17 in. double	4.55	**9.05**
130	Odd size	2600		4.75	9.30
146		2800	19 in double	4.95	**10.05**
160		4000		8.05	**16.**

SPEED TABLE—Continued.

Circumstances generally determine the speed for chain to be run, but where possible it should be kept down to a moderate rate. The heavy line shows the limit of speed at which it is advisable to operate the various sizes—but conditions vary and often a higher speed may be satisfactorily used.

AT THE SPEED OF CHAIN AS NOTED

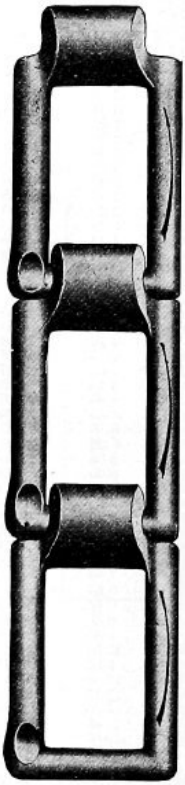
FEET PER MINUTE

300	400	500	600	700	800	900	1000
.46	.58	.73	.89	1.02	1.22	1 30	1.45
.63	.82	1.05	1.25	1.40	1.60	1.68	1 78
.65	.83	1.10	1.32	1.38	1.62	1.69	1 80
1.05	1 35	1.65	1.95	2.25	2.55	2.75	3.
1 25	1.40	1.60	2.	2.45	2.60	3.	3 25
1.20	1 65	2.05	2.33	2.60	2.90	3 25	3 50
1 30	1.70	2 15	2 40	2 65	3.	3.28	3 75
1 38	1 85	2 25	2.65	3.05	3.45	3 75	4.
1.40	1.85	2 25	2 65	3.05	3.45	3 75	4.
1 28	1.72	2 30	2.35	2.65	3.	3.25	3 70
1.45	1 85	2 25	2.65	3.	3.50	3 75	4.
1.60	2.10	2 55	3.	3.35	3.75	4 10	4 50
1 50	2.10	2 55	2 95	3.40	3.75	4.15	4 45
1 55	2.35	2 55	3.	3.35	3.70	4 15	4 50
1 60	2 10	2 60	3 25	3.40	3.75	4.20	4 60
2.30	3.	3 65	4 25	5.	5.60	6.20	7.
1 60	2 25	2 60	3 15	3.55	3 90	4.30	4 80
1 70	2 25	2 70	3 20	3.65	4 05	4.45	4 85
1 40	1.85	2 25	2.75	3.05	3.50	3 75	4
2.30	3.	3 70	4 05	4.20	4.45	4.80	5 35
1 75	2 35	2.90	3.50	3.90	4.20	4.50	4.95
1 75	2 35	2 90	3 35	3 85	4.30	4.75	5 05
1 95	2 40	3 25	3.70	3.90	4.25	4.65	4 75
2.40	3 20	3.95	4.65	5 20	5.85	6.45	7.
2.75	3.60	4.40	5 05	5.70	6.40	6.95	7.45
2 85	3 80	4.45	5 20	5.95	6 45	7.30	8 05
2 45	3 15	3.95	4.65	5,25	5.85	6.45	7 05
2.70	3 65	4.25	5 05	5.70	6.35	7.05	7.55
2 30	3 05	3.85	4.40	5.05	5.65	6 20	6 60
3.15	4 10	4.75	5.55	6.25	6.95	7.45	8 30
2 35	3 05	3.85	4 50	5.05	5.75	6.30	6 70
3.	4.	4 75	5.50	6 15	6.85	7.45	8 10
2 80	3.85	4.55	5 25	5 95	6.50	7.10	7 80
3 10	4.15	4.85	5 50	6.20	7.	7 30	8 15
2 90	3.70	4.45	5.10	5.80	6 40	7.05	7 75
3.20	4 25	4.85	5 60	6.30	7.	7.50	8 25
2 80	3.80	4 55	5 25	5.85	6.45	7 15	7 80
3 65	4 85	5.85	6 75	7.65	8 35	8 95	9 55
3.85	4.90	6 20	7.25	8.	8.70	9 45	10 10
5.20	6 85	8 05	9.35	10 35	11.45	12.55	13 65
5.15	6 85	8.05	9.25	10.35	11.45	12 55	13 65
5.15	6 85	8 05	9.25	10 35	11 45	12 55	13 65
4.80	6.50	7.65	8.75	9.85	10.85	11.85	12 85
5.45	7.25	8.55	9.85	11.05	12 25	13 30	14 40
4.25	5 65	6 80	7 75	8.75	9 65	10.55	11 45
3.30	4.50	5.25	6.05	6.75	7.55	8.25	9 05
3.95	5.25	6.35	7.35	8.25	9.05	9.85	10 55
4.55	6.05	7.30	8.55	9.55	10.55	11.30	12.
5.35	7.05	8.65	9 80	11 05	12.05	13 05	14.
6.	8.10	9.80	11 30	12.80	14.05	15 05	16.
6.05	8.15	9.90	11 40	12.90	14.15	15.15	16 05
6.05	8.	9.80	11.30	12 80	14 05	13.05	16.
9.	11.50	13.50	15	16.50	18.	19.	20
6.15	8.10	9 90	11.40	12.85	14 10	15 20	16 05
9.10	11.60	13 55	15 05	16.55	18.05	19 05	20 05
10.15	12.65	15.15	17.15	19 15	20.65	22 15	23 05
9.10	11.40	13 55	15 05	16.55	18.05	19 05	20 05
9 05	11.60	13 60	15.05	16 55	18.05	19 05	20.05
10.05	12 65	15 05	17.05	19.05	20 55	22 05	23.
8.45	11.	12 75	14 05	15.55	16.50	17 50	18 05
11 95	15.	16.95	19.	21.	23.05	25 05	27.
12.00	15 10	17.	19 05	21.05	23.10	25 10	27 05
11.95	14.95	17.	19.	21.	23.	25.	27.
12.35	15.45	17 55	19.55	21.55	23.55	25 55	27 55
12.95	16 05	19 05	21.05	23.05	25 05	27 05	29 05
13.05	16 15	19 05	21.10	23.10	25.10	27 10	29.10
13.65	17 05	20 05	21.60	23.60	25.60	27 60	29 60
13.55	17.05	20.05	22 05	24.05	26 05	28 05	30
14.	17.35	20 55	22.55	24 55	26.55	28.55	30 55
15.	20 05	25.05	28.05	33 05	37.05	40,05	45.
24.	31 95	40.00	44.95	50.	55.05	60.	65.

DETACHABLE LINK BELTING.

No. 25

No. 32



No. 34

No. 35

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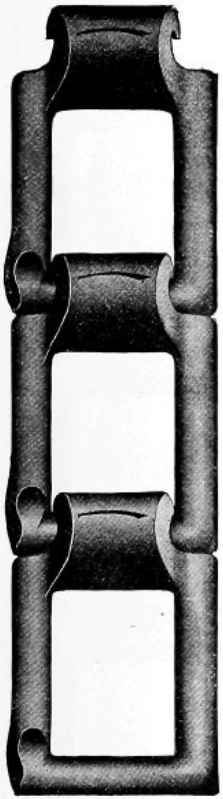
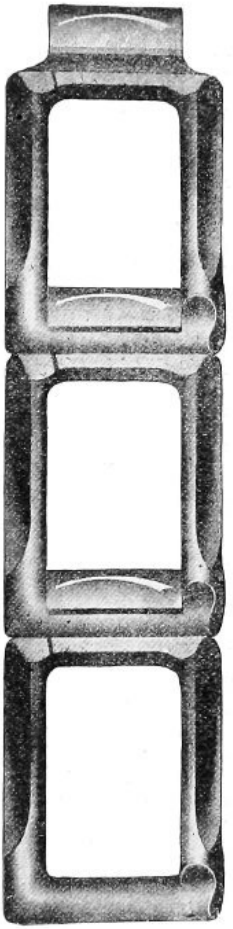


No. 42

No. 45



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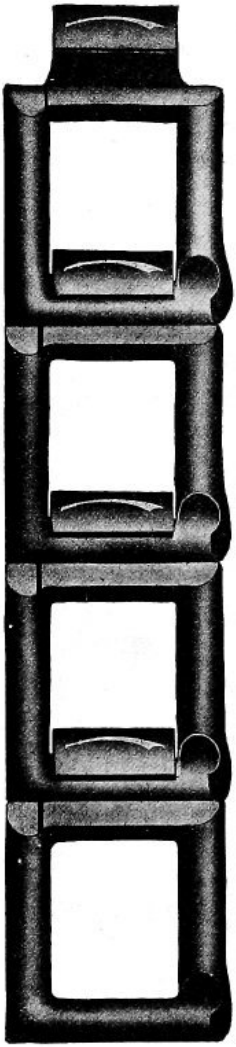

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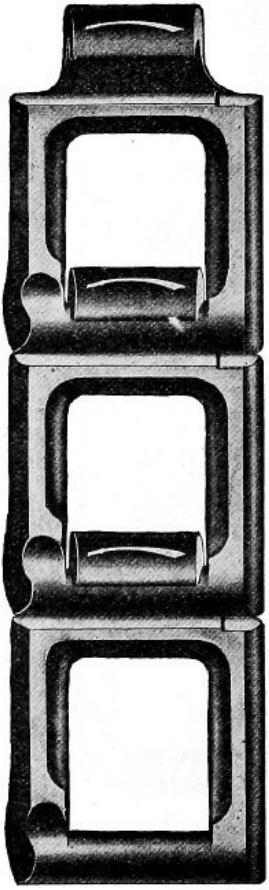

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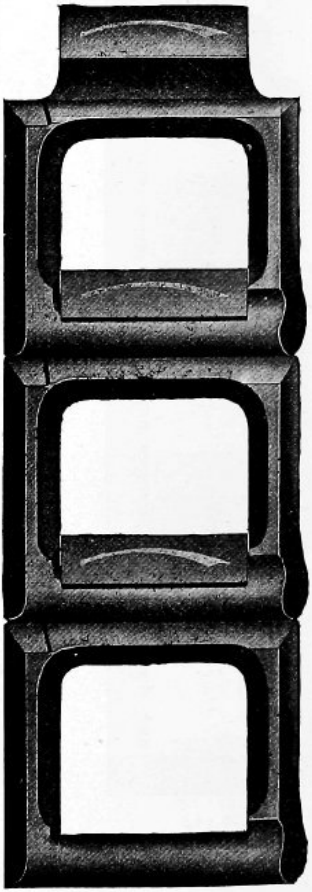

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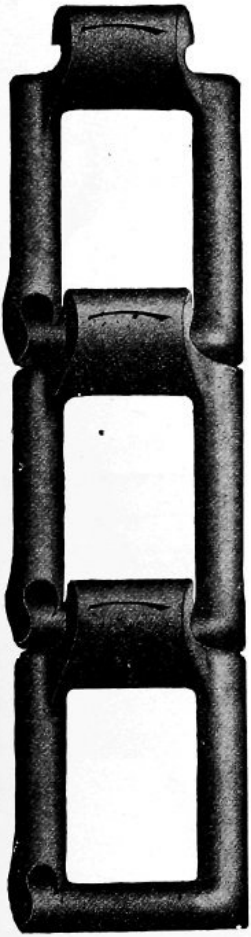

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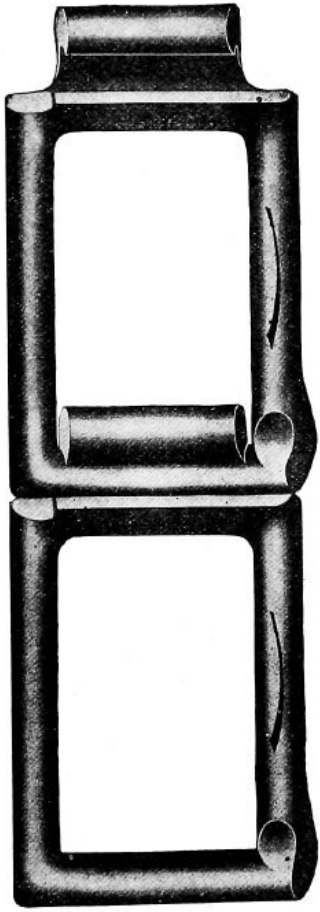

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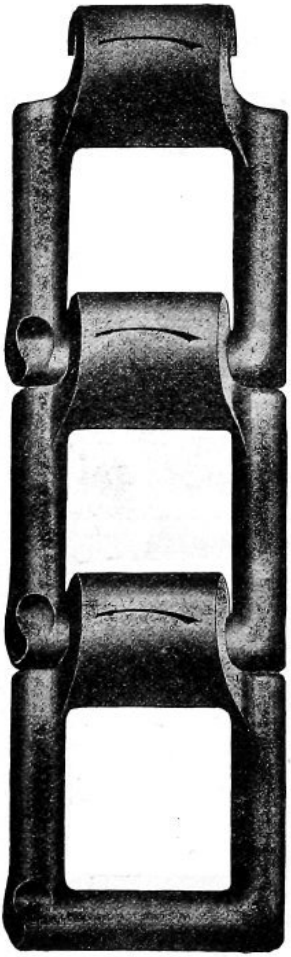

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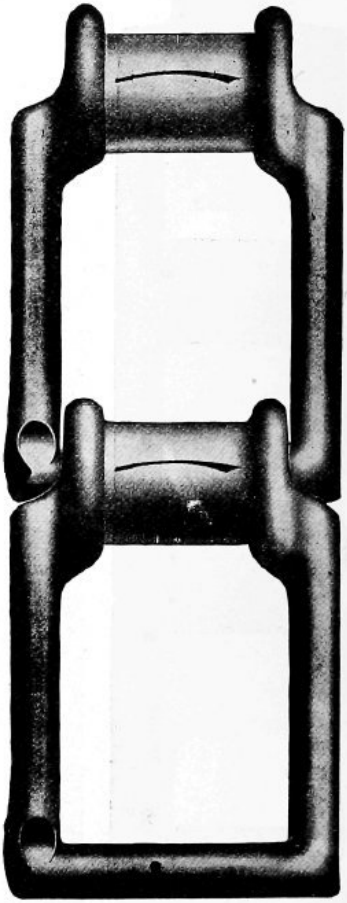

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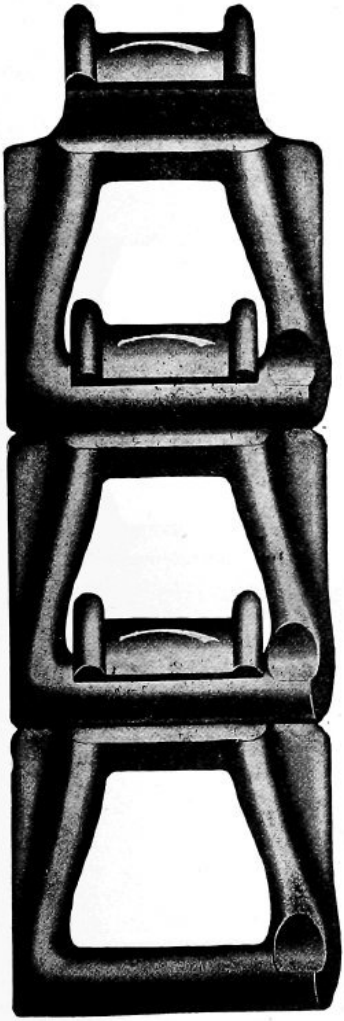

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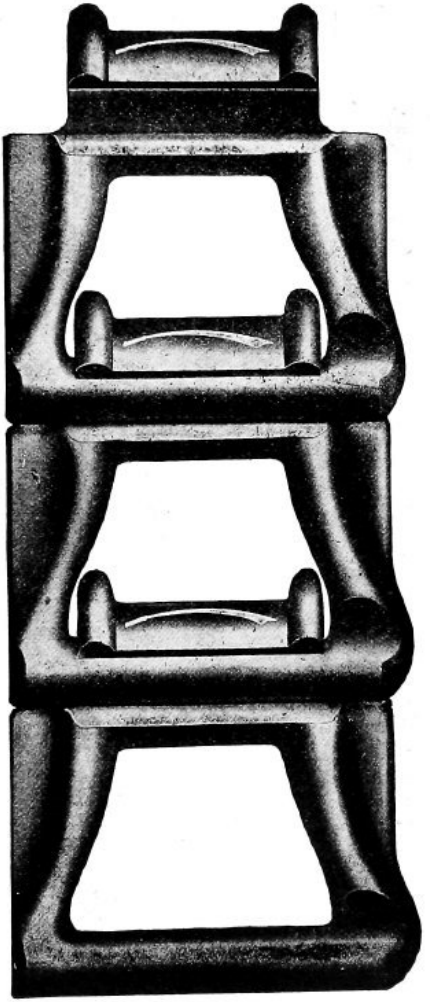

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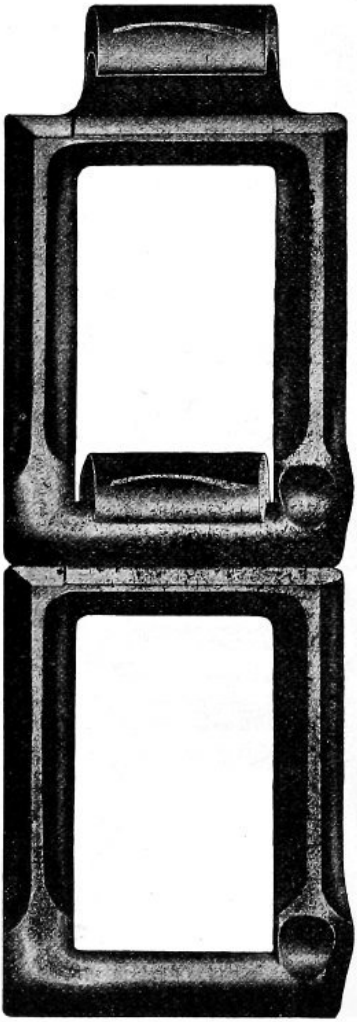

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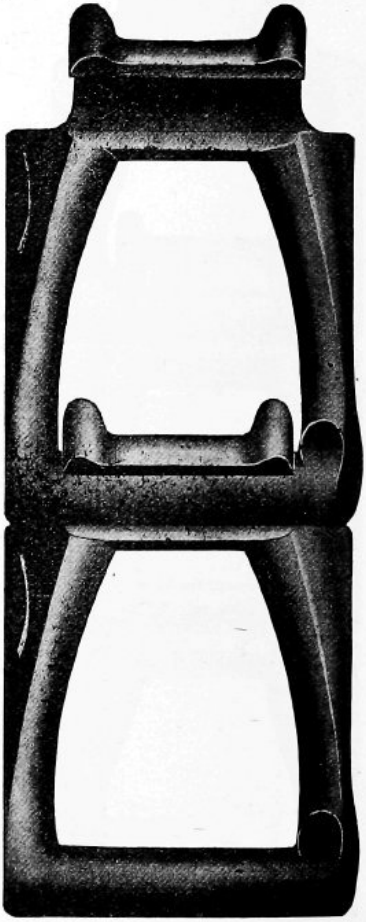

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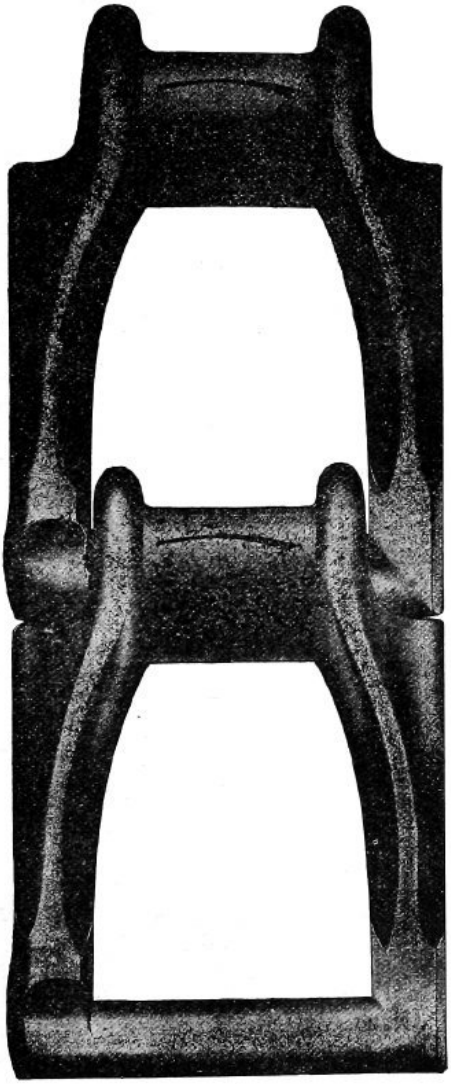

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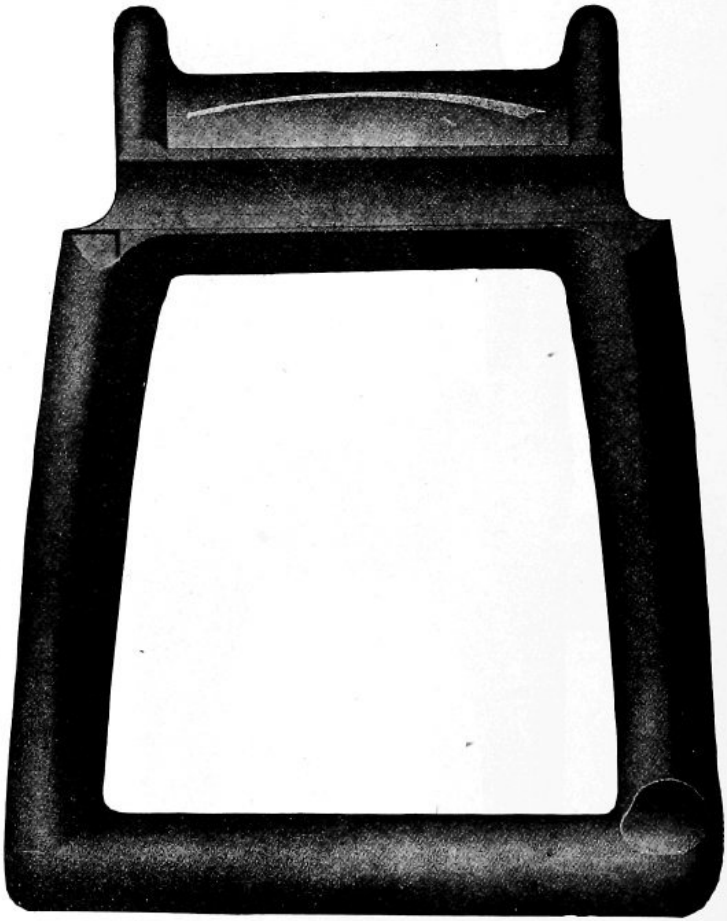

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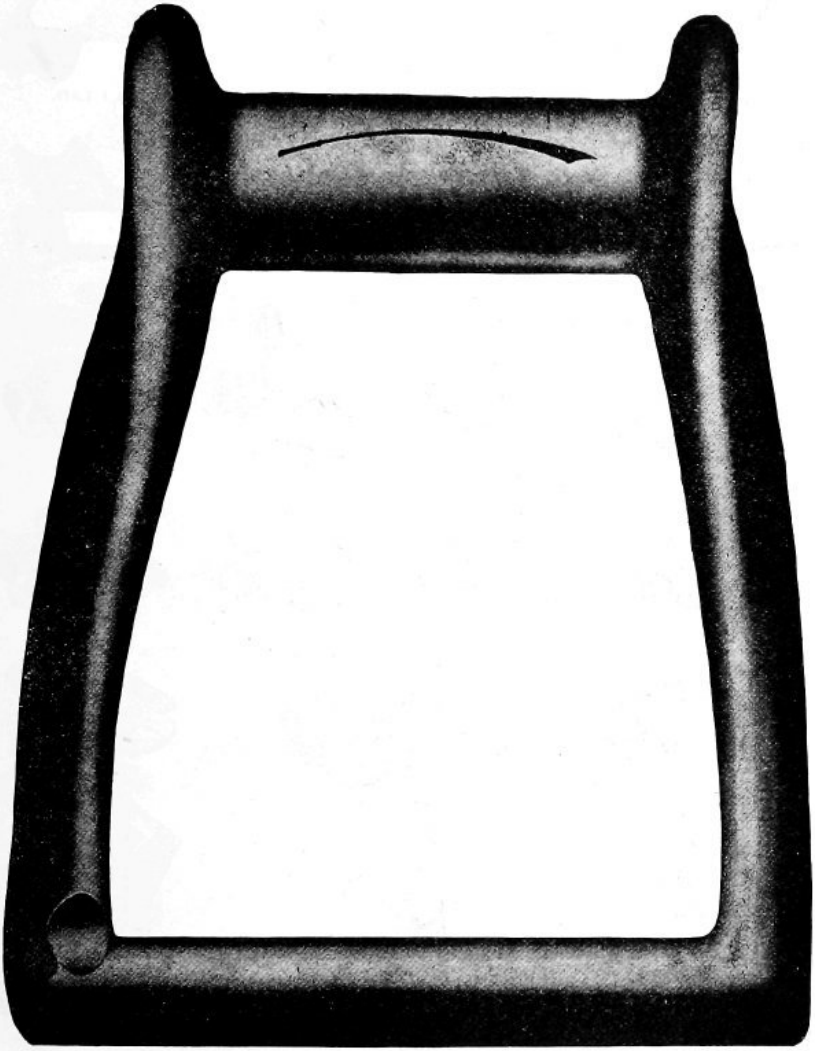
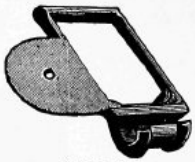


No. 108

ATTACHMENTS

AS USUALLY MADE.

A 1 Right.



A 1 Left.

A 2.

A 11.

A 3.

C 1.

D 3.

D 5.

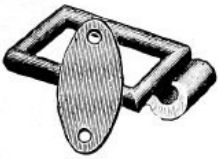
E 2.

F 1.

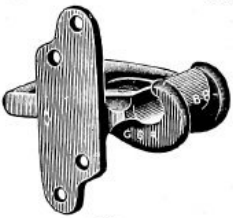
F 2.

F 4.

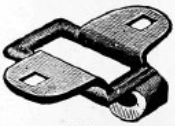
F 5.



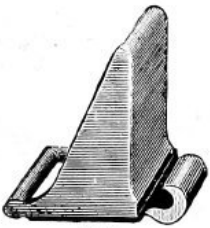
G 1.



G 6.



K 1.



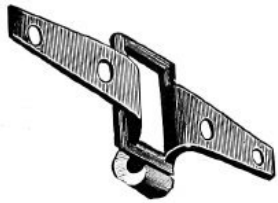
H 2.

H 1.

H 6.

ATTACHMENTS—CONTINUED.

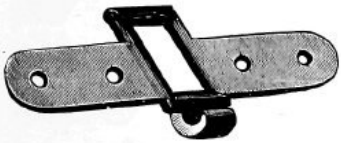
K 2.



K 3.

K 4.

K 5.



K 6.

K 7.

M 1.

M 3.

R 1.

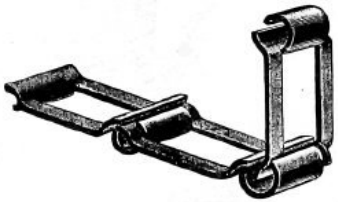
S 1.

S 2.

S 2¼.

Coupler.

The LOCKE Tempered Steel Detachable Sprocket-Chain *and* Attachments



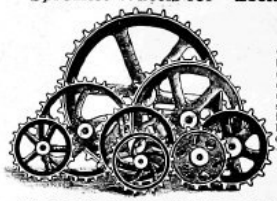
REVISED PRICE-LIST.

Effective October 1st, 1902.

No.	Working Load.	Approximate in Leather Belting.	Links Per Foot.	PRICE PER FOOT. All Plain Links.	All Attachment Links.	With Attachments at intervals.
26	75 lbs.	1 in. single.	13.3	$0.12	$0.28	$0.17
32	150 "	1½ " "	10.4	.12	.25	.17
33	200 "	2 " "	8.6	.12	.25	.17
34	225 "	2½ " "	8.6	.12	.25	.17
35	250 "	2½ " "	7.4	.12	.25	.17
42	300 "	3 " "	8.8	.13	.27	.18
43	350 "	3½ " "	7.4	.13	.27	.18
51	375 "	3½ " "	10.4	.17	.30	.22
52	500 "	4 " "	8	.18	.30	.22
53	450 "	4 " "	7.4	.18	.28	.21
57	600 "	6 " "	5.2	.18	.34	.24
62	650 "	6½ " "	7.3	.24	.41	.30
66	700 "	6½ " "	6.	.24	.41	.30
67	700 "	7 " "	6.2	.24	.41	.30
75	750 "	7½ " "	4.6	.28	.45	.34
77	800 "	8 " "	5.2	.28	.45	.34
78	1000 "	10 " "	4.6	.32	.56	.40
83	1200 "	12 " "	3.	.36	.67	.53
85	1300 "	9 " double.	3.	.40	.70	.54
88	1200 "	8 " "	4.6	.38	.68	.53
93	1600 "	10 " "	3.	.45	.79	.56
95	1600 "	10 " "	3.	.48	.90	.68
103	1850 "	12 " "	4.	.60	.90	.75
105	1500 "	10 " "	2.	.54	.75	.65
108	1800 "	12 " "	2.5	.60	1.00	.82
110	2000 "	13 " "	2.6	.75	1.20	.90
114	2000 "	13 " "	2.7	.75	.96	.87
124	2250 "	17 " "	3.	.90	1.50	1.20
140	4000 "		1.2	1.20	1.80	1.50

...Other and Special Sizes also furnished...

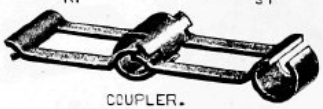
Sprocket Wheels for "Locke Chain"



In ordering wheels give number of chain to be used; diameter of wheel and number of teeth; size of bore and if set screws or key-seat is required.

Same Kind *of* Wheels and Same List as in General Use.

All Attachments *of* Tempered Steel



COUPLER.

FILE HANDLES.

Soft Wood, Brass Ferrule, assorted.....per doz., $0.25
" " " " all large..... " .30

AUGER HANDLES (Common).

Hickory Polished.

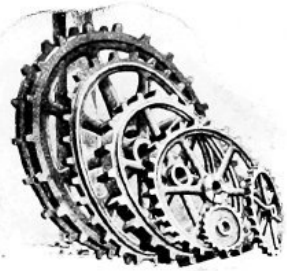
Assorted, from ¼ to 2 inches .....per gross, $5.50
" " 1 to 2 " ..... " 6.50

CHISEL HANDLES.

Leather Tipped

Maple Socket Firmer Chisel ..... per doz., $6 00
Assorted Nos. 1 to 4 sizes.
Maple Socket Framing Chisel..... .....per doz., 7.00
Assorted Nos. 1 to 8 sizes.

SPROCKET WHEELS.



No. 25.

Pitch Diameter Inches.	No. of Teeth.	Price.
2	7	$0 80
2⅛	8	85
2¼	9	90
3⅛	11	1 00
3¾	13	1 10
4	14	1 10
4¼	15	1 15
5	17	1 25
5½	19	1 40
6¼	22	1 50
7½	26	1 70
8	28	1 80
10	35	2 10
12	42	2 40
13¾	48	2 70
16	56	3 10
18¼	64	3 50

No. 32.

3	8	$0 95
6	16	1 45
8¼	22	1 80
18	48	4 10

Nos. 33, 34,

Link Belting will run on the following Wheels.

3	7	$0 95
4	9	1 15
4⅛	10	1 25
5½	12	1 45
6½	15	1 70
7	16	1 80
8½	19	2 00
9¾	22	2 25
12	27	2 60
14¼	32	3 05

Nos. 35, 45 and 55

Link Belting will run on the following Wheels.

Pitch Diameter Inches.	No. of Teeth.	Price.
2½	5	$0 90
3	6	1 00
3½	7	1 10
4¼	8	1 25
4¾	9	1 35
5¾	11	1 55
6	12	1 65
7	13	1 75
7½	14	1 85
8½	16	2 05
8¾	17	2 15
9½	18	2 25
10	19	2 35
10½	20	2 45
12	23	2 80
13	25	3 00
14¼	27	3 30
16	31	3 70
18¼	35	4 20
20¼	39	4 65
21¾	42	5 00
23½	45	5 40
30	58	7 50

3	7	$1 10
3¾	9	1 20
4⅛	10	1 30
4¾	11	1 35
5¾	13	1 45
7	16	1 80
8¼	19	2 00
10½	24	2 40
11¾	27	2 70
14	32	3 20
15¾	36	3 50
18	41	4 00
20¼	46	4 50

No. 52.

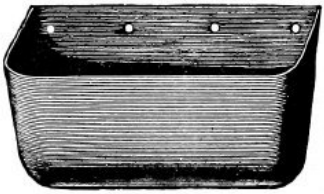
Pitch Diameter Inches.	No. of Teeth.	Price.
3½	7	$1 10
4¼	9	1 30
5	10	1 40
5½	12	1 55
6	13	1 65
6½	14	1 75
7	15	1 85
8	17	2 05
9	19	2 30
9½	20	2 40
10	21	2 50
12½	26	3 00
13	27	3 15
14½	30	3 50
16½	34	4 00
18	38	4 50
20	42	5 00
23¾	49	5 80
26½	55	7 00
30½	64	8 00

Nos. 57, 67 and 77

Link Belting will run on the following Wheels.

4¾	6	$1 45
5½	7	1 55
6	8	1 70
6¾	9	1 85
7½	10	2 00
8	11	2 15
8¾	12	2 30
9½	13	2 50
11	15	2 85
12½	17	3 25
14	19	3 65
14¾	20	3 85
15½	21	4 05
16¼	22	4 25
17	23	4 50
18¼	25	5 00

SALEM STEEL ELEVATOR BUCKETS.



Suitable for Ordinary Mill and Elevator Work.

PRICE LIST.

Capacity: Bushels per Hour. 200 Feet per Minute. 12 Inches Apart.	Size of Bucket.					Gauge of Steel Used.	Price.
	Width.			Projection.			
21	2	x	2	inches.		No. 25	$0.04
40	2½	x	2¼	"		" 24	.05
59	3	x	2½	"		" 24	.06
69	3½	x	2½	"		" 24	.07
87	3	x	3	"		" 23	.09
102	3½	x	3	"		" 23	.10
116	4	x	3	"		" 23	.11
131	4½	x	3	"		" 23	.12
159	4	x	3½	"		" 22	.12
179	4½	x	3½	"		" 22	.13
199	5	x	3½	"		" 22	.14
229	5	x	4	"		" 22	.18
251	5½	x	4	"		" 21	.19
274	6	x	4	"		" 21	.20
500	7	x	4½	"		" 20	.30
670	8	x	5	"		" 19	.41
754	9	x	5	"		" 19	.43
973	10	x	5½	"		" 19	.54
1220	10	x	6	"		" 18	.62
1342	11	x	6	"		" 18	.65
1464	12	x	6	"		" 18	.68
1708	14	x	6	"		" 18	.74
1952	16	x	6	"		" 18	.81

SALEM STEEL ELEVATOR BUCKETS.

(Continued.)

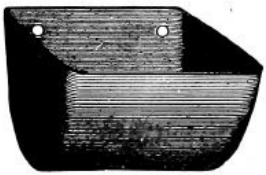
Suitable for Ear Corn, Cobs, Etc.

PRICE LIST.

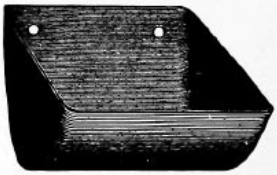
Capacity: Bushels per Hour; 200 Feet per Minute; 12 In. Apart.	Size of Bucket: Width.	Projection.	Gauge of Steel Used.	Price.
670	8 x 5	inches	No. 16	$0.59
754	9 x 5	"	" 16	.63
973	10 x 5½	"	" 16	.76
1220	10 x 6	"	" 16	.81
1342	11 x 6	"	" 16	.85
1464	12 x 6	"	" 16	.89
1708	14 x 6	"	" 16	.97
1952	16 x 6	"	" 16	1.05
2196	18 x 6	"	" 16	1.13
2440	20 x 6	"	" 16	1.21
1590	10 x 7	"	" 16	1.01
1749	11 x 7	"	" 16	1.05
1908	12 x 7	"	" 16	1.09
2226	14 x 7	"	" 16	1.17
2544	16 x 7	"	" 16	1.25
2862	18 x 7	"	" 16	1.33
3180	20 x 7	"	" 16	1.41

Prices of other sizes and gauges of material furnished upon application.

STANDARD MALLEABLE IRON BUCKETS.



Style A.



Style B.

PRICE LIST. STYLE A.

Width on Belt.	Projection.	Capacity in Pints.	Price.
4½ inches.	3 inches.	¼ pints.	$0.40
6 "	4 "	1¼ "	.50
7 "	4½ "	2 "	.65
8 "	5 "	3 "	.80
10 "	6 "	5¼ "	1.10
10 "	7 "	7 "	1.25
11 "	6 "	5¾ "	1.25
12 "	6 "	7 "	1.40
12 "	7 "	7½ "	1.50
14 "	6 "	9 "	1.60
14 "	7 "	10¼ "	1.80
16 "	7 "	13¾ "	2.00
16 "	8 "	15 "	2.25
18 "	8 "	19½ "	2.60
20 "	10 "	22 "	3.20

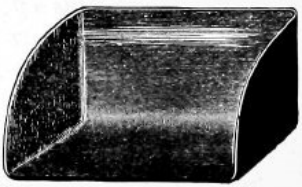
PRICE LIST. STYLE B.

Width.	Projection.	Capacity in Pints.	Price.
8 inches.	3½ inches.	1.4 pints.	$0.65
10 "	4 "	1.8 "	.90
12 "	5½ "	4.0 "	1.15

PRICE LIST. STYLE C.

Width.	Projection.	Depth.	Capacity Cubic Inches.	Pints.	Price.
8 in.	4½ in.	4 in.	80	2	$0.65
10 "	5 "	4 "	120	3	.90
12 "	5 "	4 "	144	4	1.10

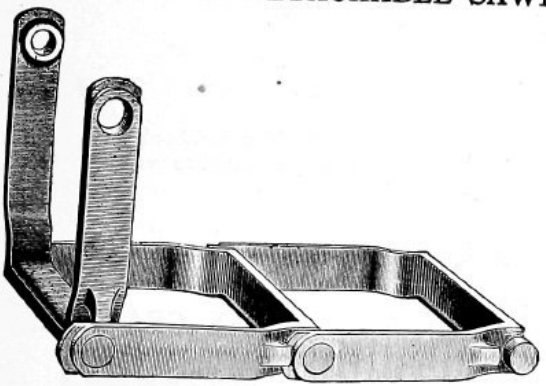
Our Malleable Buckets are seamless, and of a pattern to insure perfect delivery.



Style C.

Other sizes furnished to order.

No. 550. DETACHABLE SAWDUST CARRIER.



This is a detachable chain and is used for horizontal conveyors in Sugar Works, Sawmills, Cement Plants, etc. The links are 7 inches wide, 6 inch pitch; ultimate strength, 5,000 lbs.

Price per foot.....$0 50

No. 550. SPROCKET WHEELS.

PRICE LIST.

			Price.
Diameter, 10¼ inches,	5 teeth	.....	$ 6 00
" 17 "	9 "	.....	9 75
" 21 "	11 "	.....	12 00

SPIRAL STEEL CONVEYOR.

Diameter.	Price per ft. Standard Steel.	Price per ft. Galvanized Steel.	Standard Lengths.	Inside Diam. Hollow Shaft.	Revolutions per Minute.	Capacity per Hour Bushels.
4 in.	$1.00	$1.28	8 ft.	1 in.	100	100
6 in.	1.67	2.03	10 ft.	1½ in.	140	300
9 in.	2.00	2.65	10 ft.	1½ in.	150	1,000
12 in.	2.80	3.48	12 ft.	2 in.	160	2,000
16 on 2 in.	3.75	4.83	12 ft.	2 in.	160	3,000
16 on 3 in.	5.08	6.38	12 ft.	3 in.	160	5,000
18 in.	6.15	7.79	12 ft.	3 in.	160	6,000

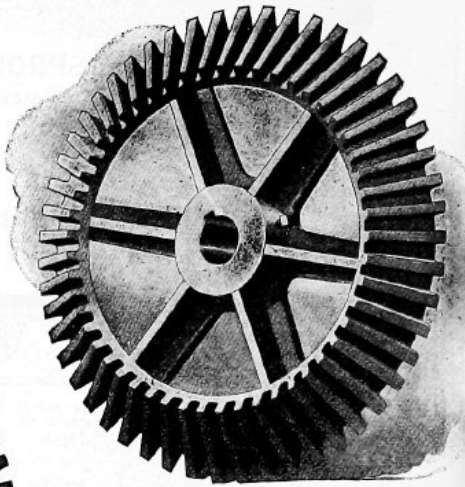
The standard lengths as given above include the width of one hanger bearing.

The above prices include linings, couplings, bolts and one hanger for each standard length of conveyor.

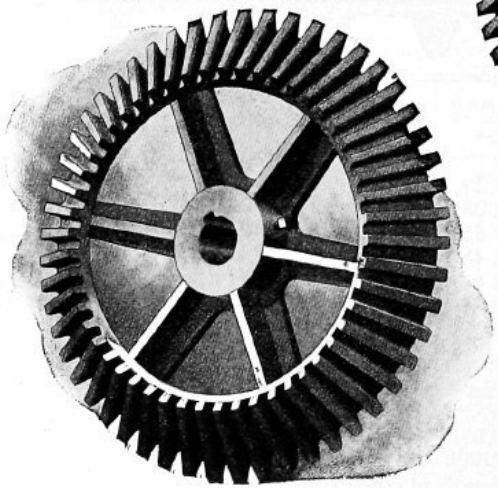
SPUR GEARING.

We are in position to fill orders for Gearing at reasonable prices and on very short notice.

MITER GEARING.



BEVEL GEARING.

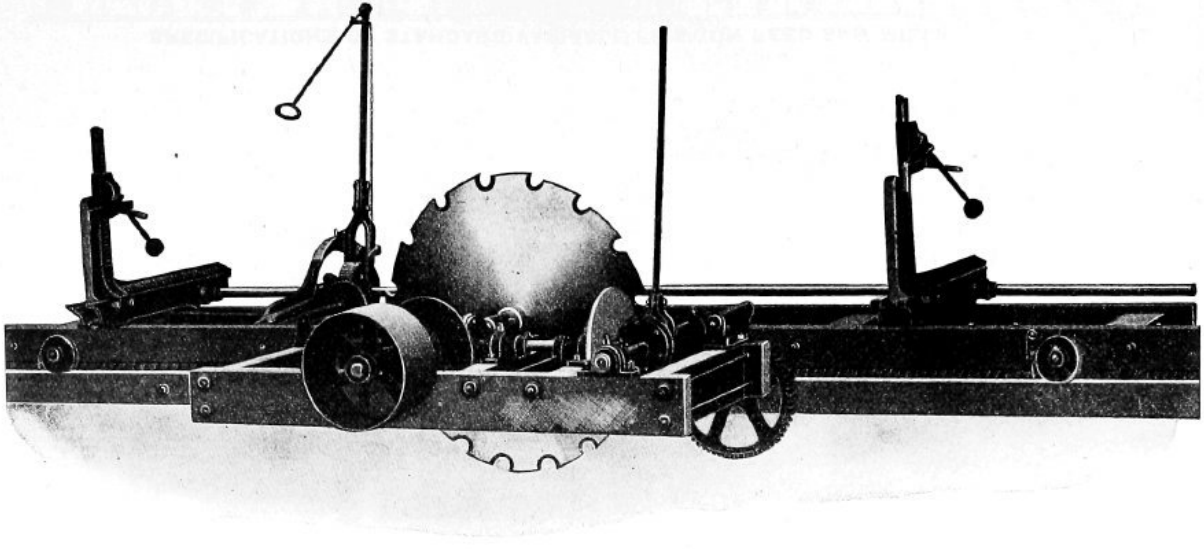


In Ordering

State if Bevel, Spur or Miter Gears are wanted, giving number of pattern, pitch, number of cogs and face. Also state if gears are to be made of CAST IRON or STEEL, and if plain, cut-gear or mortise gearing is wanted.

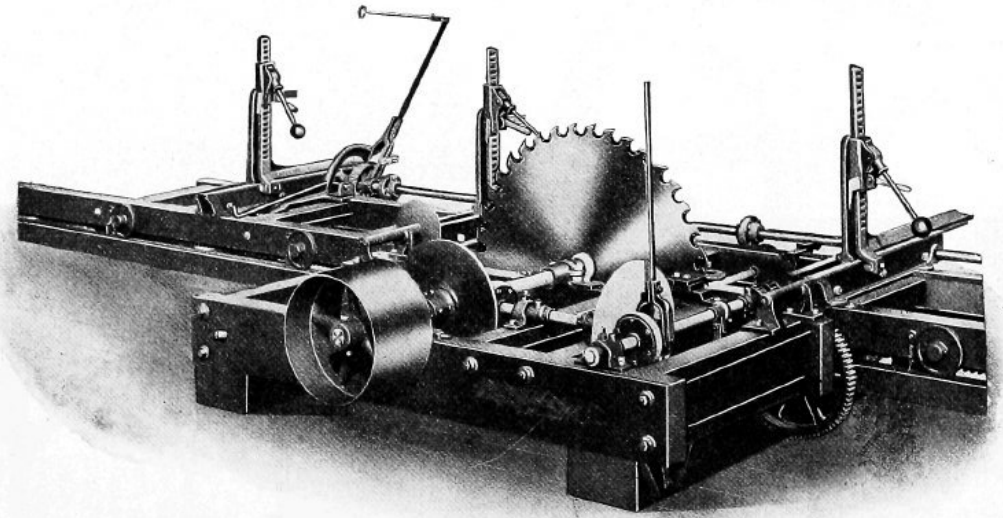
Give exact size, bore and key-seat. Where Bevel or Miter Gears are wanted, advise if key is to be driven from back or front of wheel.

No. 0 PONY SAW MILL.



For full specifications see page 718.

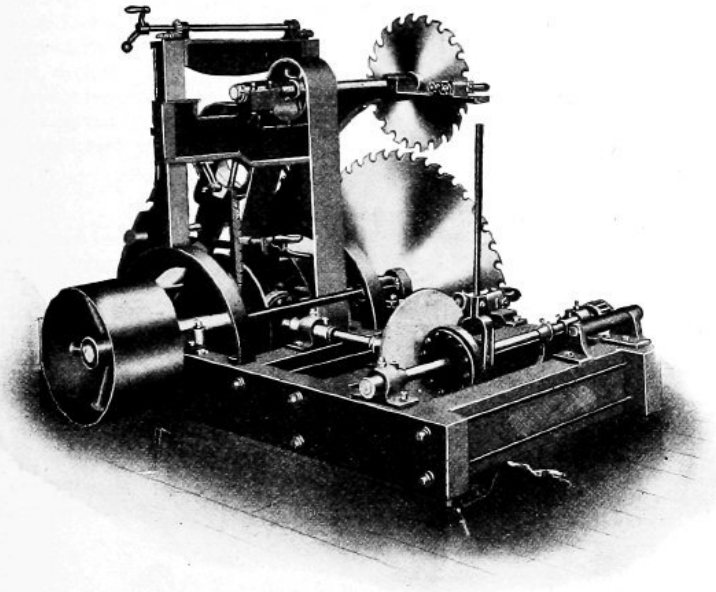
Nos. 1½ AND 2 SAW MILLS.



SPECIFICATIONS OF STANDARD VARIABLE FRICTION FEED SAW MILLS

Number of Mill	Catalog Page	Diameter Mandrel	Length Husk	Width Husk	Husk Timbers	Mandrel Pulley	Diameter Paper Filler	Length Carriage	Width Carriage	Carriage Timbers	Length Rack Bar	Truck Axles	Trucks	Number Trucks	Set Shaft	Length Set Shaft	Length Track Iron	Head Blocks Open	Takes Logs	Takes Saw	Horse Power	Capacity Per 10 Hours	Weight
0 Pony	15	2 3 10	7′	2′8″	3 1 2X 7 1-2	20X 8	8 1-2″	10′	26″	3 1-2X5 1-2	22′	1 1- 8″	6″	4	1 11-16	15′	35′	36″	40″	54″	4 to 15	2 to 8 M	2,200
1	17	2 3-16	7′6″	3′6″	3 1-2X 9 1-2	20X10	8 1-4″	22′	26″	3 1-2X5 1 2	27′	1 1- 8″	6″	6	1 11-16	15′	45′	36″	40″	54″	4 to 20	2 to 10 "	2,600
2 Pony	16	2 3 16	7′6″	3′6″	3 1-2X 9 1-2	20X10	8 1-4″	18′	36″	4 1-2X6 1-2	26′	1 7-16″	8″	4	1 15-16	14′	45′	43 1-2″	48″	54″	4 to 20	2 to 10 "	3,200
1½	18	2 7-16	8′4″	4′	4 1-2XII 1-2	20X12	8 1-4″	24′	36″	4 1-2X6 1-2	32′	1 7-16″	8″	6	1 15-16	18′	50′	43 1-2″	48″	60″	4 to 25	2 to 12 "	3,400
2	18	2 11-16	9′	4′6″	4 1-2XII 1-2	20X12	10 1-2″	24′	36″	4 1-2X6 1-2	32′	1 7-16″	8″	6	1 15-16	18′	50′	43 1-2″	48″	60″	10 to 30	5 to 15 "	3,800
2 Special	19	2 11-16	9′	4′6″	4 1-2XII 1-2	20X12	10 1-2″	24′	38 1-2″	4 1-2X6 1-2	32′	1 7-16″	8″	6	1 15-16	18′	50′	48″	52″	60″	10 to 30	5 to 20 "	4 000
3	19	2 15 16	9′6″	5′	5 1-2XII 1-2	24X14	12″	24′	40″	5 1-2X7 1-2	32′	1 11-16″	10″	6	2 3-16	18′	50′	49″	54″	66″	20 to 40	10 to 30 "	6,800

DOUBLE SAW MILLS.

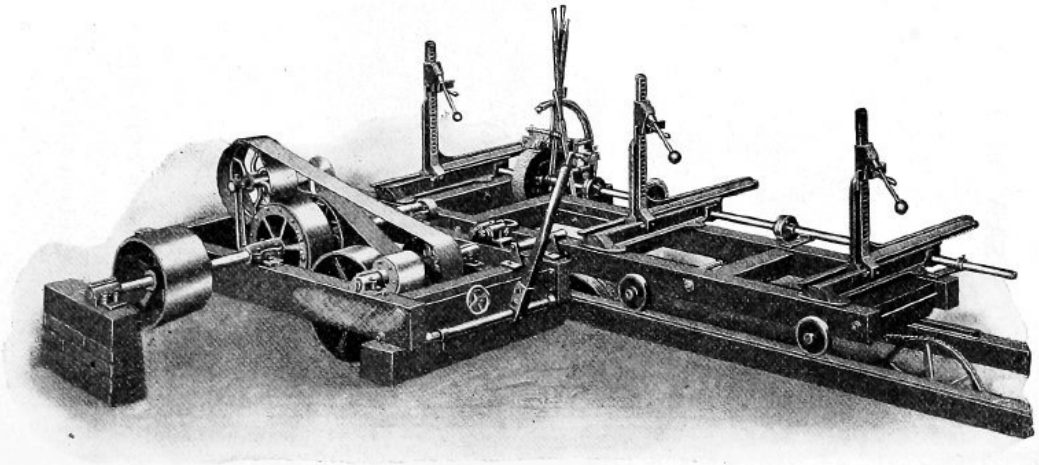


Nos. 1½, 2 and 3.

These Mills are made in three sizes with variable feed, viz., Nos. 1½, 2 and 3, and four sizes with "Simplex" feed, viz., Nos. 2, 3, 4 and 5.

Weight of top saw frame complete about 1,200 lbs.

THE "SIMPLEX" FEED SAW MILLS.



Nos. 2, 3 and 4.

SPECIFICATIONS OF "SIMPLEX" MILLS.

No. 2.

Husk frame 9 feet long, 4 feet 6 inches wide, made of 5x12 inch timbers; steel mandrel 2 11/16 inches in diameter, 10 feet long, with three adjustable boxes 9¾ inches long, with oil chamber and wick; pulley 24 inches diameter, 12 inch face; improved saw guide; board rollers; spreader-wheel; "Simplex" feed, with pulleys 6 inch face; **Carriage** 36 feet long, in three sections, 36 inches wide; timbers 5x7 inches; nine sets of trucks 8 inches diameter, with 1½ inch axles, set in heavy babbitted boxes; collars in front of loose wheels to take up lost motion; 80 feet of track iron, back side of "T" rail dressed and front side flat wrought iron, with screws and spikes; three simultaneous ratchet head blocks, opening 43½ inches from the saw, each fitted with "Champion" Duplex dog; 30 feet of 1 15/16 inch set shafting, key seated entire length, with flange couplings and single-acting set works complete; wire rope outfit for carriage, consisting of 18 inch drum, shaft and bearings; two 18 inches have pulleys, and sufficient ½ inch flexible steel wire rope to give carriage 40 feet of stroke each way.

No. 3.

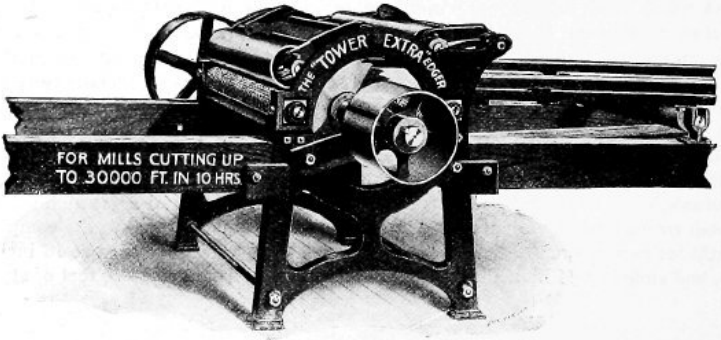
Husk frame 9 feet 6 inches long, made of 6x12 inch timbers 2 15/16 inches diameter; steel mandrel 10 feet long, with three adjustable boxes 11 inches long, with oil chamber and wick; pulley 24 inches diameter, 14 inch face; board rollers; spreader-wheel; "Simplex" feed; pulleys 8 inch face; **Carriage** 36 feet long, three sections, 40 inches wide, made of 6x8 inch timbers; nine sets of trucks, 10 inches diameter, 1¾ inch axles, set in heavy babbitted boxes, with cups for waste and oil; collars in front of loose wheels to take up lost motion; 80 feet of track iron, back side of "T" rail dressed and front side flat wrought iron, with screws and spikes; three simultaneous ratchet head blocks, opening 49 inches from the saw, each fitted with "Champion" Duplex dog; 30 feet of 2 3/16 inch set shaft, key seated the entire length, with flanged couplings and single-acting set works complete; wire rope outfit for carriage, consisting of 30 inch drum, shaft and bearings for drum, two 30 inch sheave pulleys and sufficient ⅝ inch flexible steel wire rope to give carriage 40 feet of stroke each way.

No. 4.

Husk frame 9½ feet long, 5 feet wide, made of 7x14 inch timbers; mandrel 3 3/16 inches, 10 feet long, with three adjustable boxes 12 inches long, having oil chamber and wick; mandrel pulley 24x16 inches; board rollers; spreader-wheel; improved saw guide; "Simplex" feed; 36 feet of **Carriage** in three sections, 57 inches wide, made of 6x8 inch timbers; nine sets of 12 inch trucks, with 2 inch axles and babbitted boxes with large cups for oil and waste; 80 feet of track iron, back side of "T" rail dressed and the front side heavy flat wrought iron, with screws and spikes; three heavy head blocks, opening 50 inches, each fitted with "Champion" Duplex dog; 30 feet of 2 7/16 inch set shaft, flanged couplings and single-acting set works complete; wire rope feed for carriage, consisting of 30 inch grooved drum with shaft and boxes; two 30 inch sheave pulleys and axles, with sufficient ⅝ inch flexible steel wire rope to give carriage 40 feet stroke each way.

When desired, these mills can be furnished with Top Saw, with additional Head Blocks, extra length Carriage, Parallel Bars on Head Blocks, Double Acting Set Works, and Coil Spring or Friction Receding Attachment.

THE "TOWER EXTRA" 3-SAW EDGER.



For Mills Cutting up to 30,000 Feet in Ten Hours.

Among the reasons for the great popularity of these celebrated Edgers are the following:

1. They take up little room.
2. They require little power.
3. The shifting mechanism is up-to-date, convenient and positive.
4. The feed rolls are adjustable in FOUR directions, which means absolute accuracy.
5. The saws may be removed easily and quickly, without disturbing the arbor.
6. The vital parts are carried by a substantial iron husk resting solidly on the floor.
7. There is no edger of the same capacity made approaching them in cheapness.

These Edgers are a combination of parts each and every one of which has been demonstrated by many years of practical experience to be highly efficient and entirely satisfactory.

The illustration shows the driving pulley side and rear end of the TOWER EXTRA Edgers Nos. 8 and 10, which have a front and a rear pressure roll. The No. 7 is exactly like the No. 8, except that the No. 7 has no front pressure roll.

Length over all, 24 feet.

Greatest width over all (over saw mandrel): Nos. 7 and 8, 64 inches; No. 10, 70 inches.

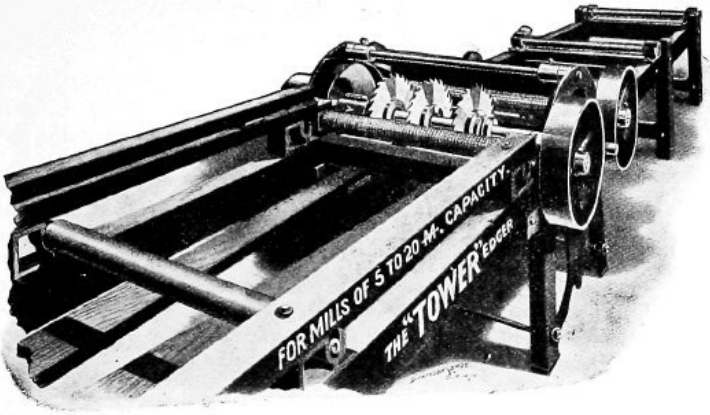
Width of Nos. 7 and 8 between guides, 36 inches; of No. 10, 42 inches.

Shipping weight of Nos. 7 and 8, 2,800 lbs.; of No. 10, 3,200 lbs.

Write us for further description and information.

THE "TOWER" 2 AND 3-SAW EDGERS.

IMPROVED.



For Mills Cutting Not to Exceed 20,000 Feet in Ten Hours.

These Edgers are admirably adapted for small mills for the following reasons:

1. They take up little room. 2. They require little power. 3. They are cheap.

At the same time they are strong and thoroughly practical, fulfilling every requirement, as is amply evidenced by the large number of them in use.

Why pay twice as much for an Edger requiring double the power and floor space, and doing no better work?

The following features further contribute to the excellence of these celebrated Edgers:

1. **The Shifting Mechanism** is up-to-date, convenient and positive.

2. **The Feed Rolls** are adjustable in four directions, which means extreme accuracy. This feature is original with us.

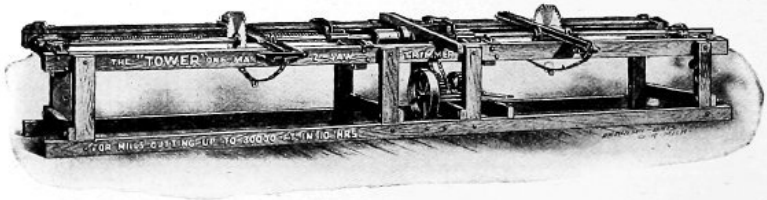
3. **The Saws** may be removed easily and quickly, without disturbing the arbor.

4. **The Saw Arbor** is provided with a steel featherkey throughout its entire length. This does away with small individual keys for the different collars.

5. **The Vital Parts** are carried by a substantial iron husk resting solidly on the floor.

Write us for further description and information.

THE "TOWER" ONE-MAN TWO-SAW TRIMMER



With this machine **one man can easily trim the output of a mill cutting up to 30,000 feet in 10 hours.**

The Adjustment Crank being attached to one of the transfer blocks, the operator shifts the saws as he walks toward the board to be trimmed, thus performing two operations simultaneously. This saves considerable time. The crank can be attached to either block.

The saws are shifted through the medium of a *double rack and pinion*—one in front (not shown in the accompanying illustration) and one in the rear—which insures extreme positiveness.

There are Two Feeds—one 30 feet per minute, the other 50.

The feed can be started, stopped or changed *without stopping the saws. One lever controls both feeds.*

The feed works are composed of *gears.* This makes the feed *positive.*

The saws travel in unison, in opposite directions. Each complete revolution of the adjustment crank increases or decreases the distance between them exactly 2 feet.

This Trimmer can be placed in a very narrow space, the width over all of the standard machine being only 5½ feet.

Both **the Arbor** and **the Feed Shaft** are of ample size, and are coupled in the center with accurately fitted flange couplings.

The Transfer Blocks are built up from steel angles, and have babbitted bearings in the center, which support the arbor and the saw while the saw is in cut. These blocks are so constructed that the board is supported as close to the saw as possible, which insures a clean cut.

The Saw Collars have 7½ inches bearing on the arbor. They are provided with steel keys.

The Driving Pulley may be in the center or at either end. If in the center, a pulley 6 inches in diameter is used; if on one end, a pulley 8 inches in diameter. Both pulleys have an 8 inch face.

The Saws are 18 inches in diameter by 10 gauge.

Speed.—The Trimmer should run 2,000 revolutions per minute.

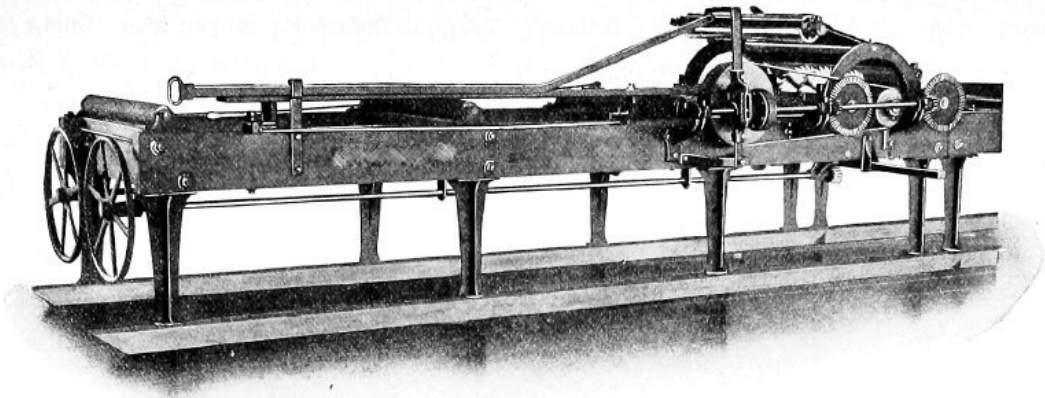
DIMENSIONS.

No. 16.	Length over all,	18	feet;	width over all,	5½	feet.	Trims from	6	to	16	feet.
No. 18.	"	"	"	20	"	"	"	"	5½	"	"	"	6	"	18	"
No. 20.	"	"	"	22	"	"	"	"	5½	"	"	"	6	"	20	"
No. 22.	"	"	"	24	"	"	"	"	5½	"	"	"	6	"	22	"

These are the regular sizes, but we can make any length desired.

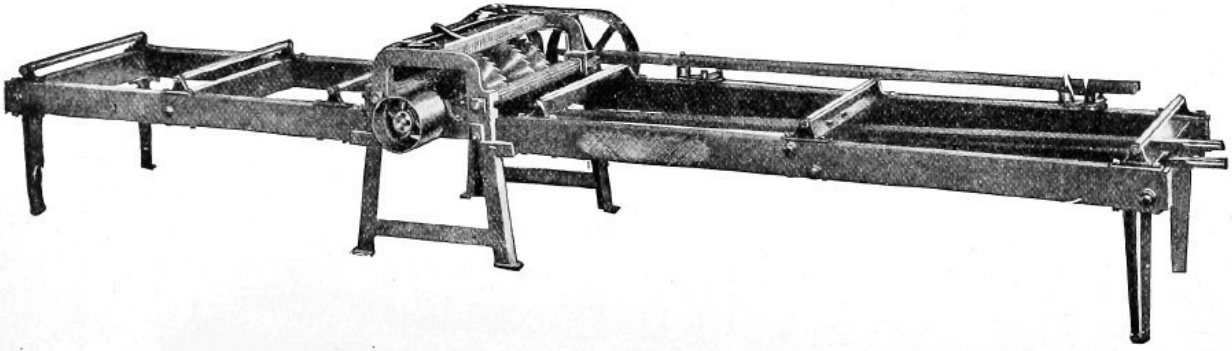
Shipping weight, 2,000 lbs.

VARIABLE FRICTION FEED GANG EDGER.



Specifications: The frame is 47 inches wide and 23 feet long, made in two sections, 15 and 8 feet respectively. The frame timbers are 3½x9½ inches. The machinery is all fitted to the 15 foot section, which has four 3 inch wrought iron rolls and four pairs of heavy cast iron legs. The short section has two pairs of legs and 3 rolls. The machine will rip 31 inches wide, 4 inches thick; extreme width inside, 38 inches. The bottom or driven feed rolls are 4 inch diameter, grooved and corrugated; mandrel, 2 7/16 inch steel, and has three long babbitted bearings, chain oiling with oil chamber. The guide for the back edge of the lumber is adjustable, so that the fixed saw can be blinded when ripping stuff with square edge. Saws are adjusted by the large hand wheels shown in cut, and give any desired width. All adjustments are within easy reach of the operator, including the lever for starting and stopping the feed, which is placed at the left hand side and near the front end of the machine. The indicator is in plain view, attached to top roll frame. Size of pulley 10x10 inches. Three 16 inch Solid Saws, two movable and one stationary, are furnished with each machine, and the machine can be built with four or five saws when desired. Inserted Tooth Saws are furnished when desired, at an extra cost. Proper speed of mandrel, 1,800. Weight, 4,000 lbs.

MEDIUM GANG EDGER.



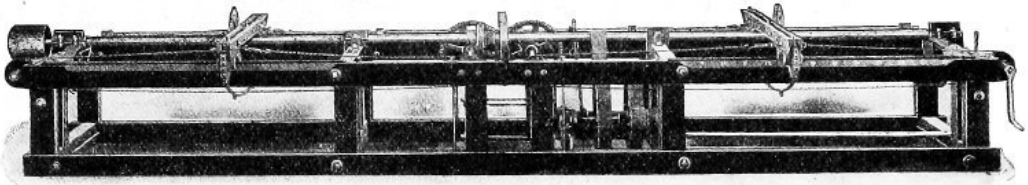
Cut No. 1.

Specifications: Extreme length of Machine, 18 feet 6 inches; Extreme width (inside), 32 inches; Maximum distance between outside saws, 21 inches; Maximum distance between inside saws, 18 inches; Minimum distance between saws, 2 inches; Mandrel, $1\frac{5}{16}$ inches; Diameter of Saw Collars, $5\frac{3}{4}$ inches; Diameter of Bottom Feed Rolls, 3 inches; Diameter of Top Pressure Rolls, $5\frac{1}{2}$ inches; Mandrel Pulley, 10x8 inches; Feed Pulleys (2), 18x4 inches; Table Timbers, $3\frac{1}{2}$x6 inches. Speed of saws, 1,500 revolutions per minute. Weight of Machine, complete, 1,400 lbs.

Furnished regularly with two 16-inch solid saws; can be furnished with three saws when desired. If preferred, inserted tooth saws can be fitted instead of solid saws, at an extra cost.

TWO-SAW TRIMMER.

Made in Two Sizes.



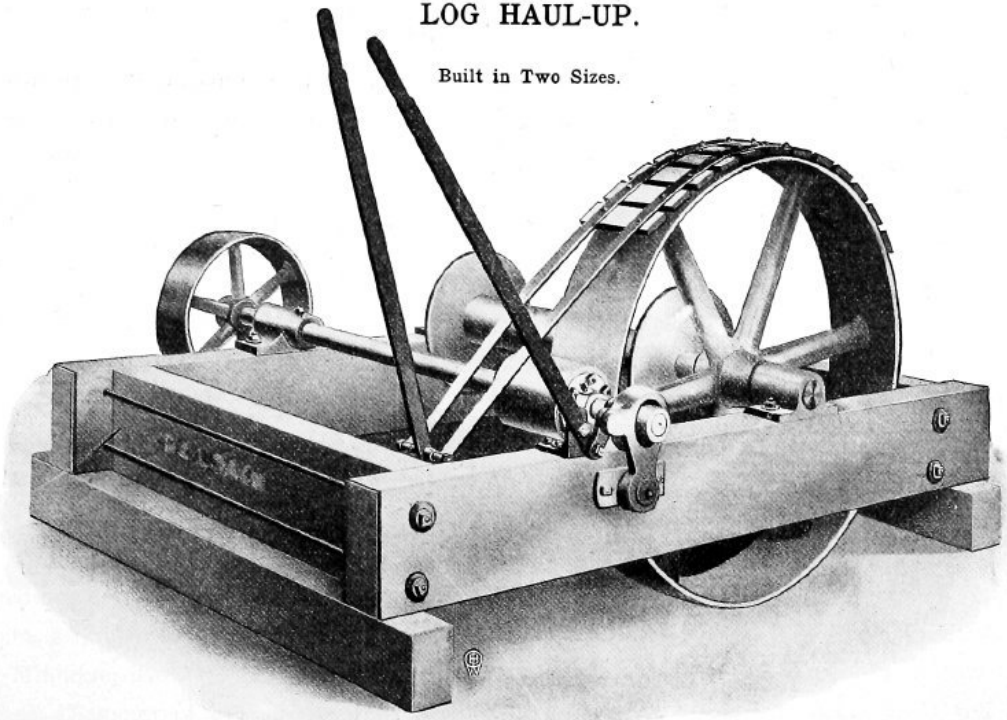
Specifications of No. 1 Trimmer: Size of Mandrel, $2\frac{3}{16}$ inches; length of Trimmer over all, 18 feet 8½ inches; width over all, 5 feet 8 inches; will trim from 8 to 16 feet long; weight, complete, 2,500 lbs.

Specifications of No. 2 Trimmer: Size of Mandrel, $2\frac{7}{16}$ inches; length of Trimmer over all, 22 feet 8 inches; width over all, 5 feet 8 inches; will trim from 10 to 20 feet long; weight, complete, 3,400 lbs.

Two 16-inch solid saws are fitted and furnished with each machine. Inserted tooth saws can be furnished, when preferred, at an extra cost.

LOG HAUL-UP.

Built in Two Sizes.

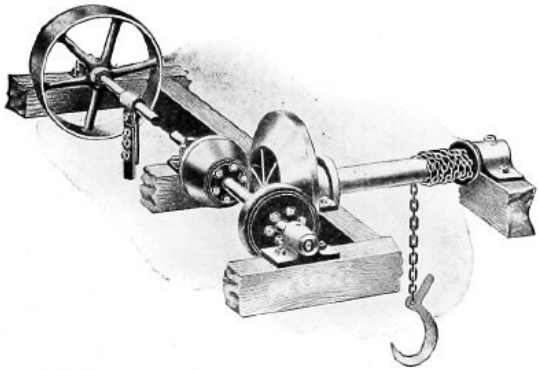


SPECIFICATIONS.

No. 1—Bull Wheel, 30x8 inches; Driving Pulley, 16x10 inches; Drum, 6x24 inches; Drum Shaft, $2\frac{7}{16}$ inches; Friction, 6x8 inches; Friction Shaft, $1\frac{15}{16}$ inches; weight, 1,000 lbs.

No. 2—Bull Wheel, 48x10 inches; Driving Pulley, 20x10 inches; Drum, 6x36 inches; Drum Shaft, $2\frac{15}{16}$ inches; Friction, 10x10 inches; Friction Shaft, $2\frac{3}{16}$ inches; weight, 1,800 lbs.

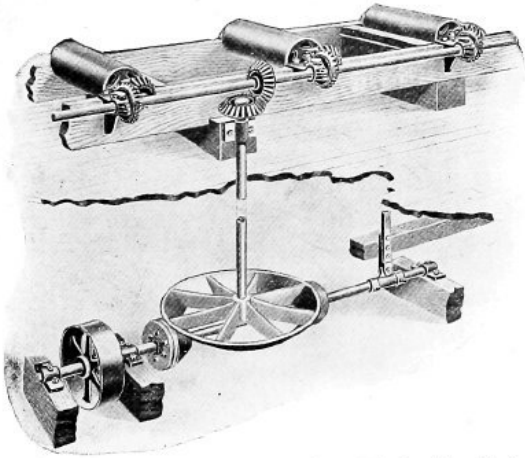
FRICTION LOG TURNERS.



Specifications of No. 1: Drive pulley, 36x6 inches; drive shaft, 2 3/16 inch; bevel paper friction, 9 inch diameter, 6 inch face; bevel iron friction, 30 inch diameter, 6 inch face; drum, 6 inch diameter, with 10 inch flanges; adjustable boxes; bolts furnished if lengths specified in order. No chains. Speed about 225 revolutions per minute.

Specifications of No. 2: Drive pulley, 36x8 inches; drive shaft, 2 7/16 inch; bevel paper friction, 12 inch diameter, 8 inch face; bevel iron friction, 36 inch diameter, 8 inch face; drum, 6 inch diameter, with 10 inch flanges; adjustable boxes; bolts furnished if lengths specified in order. No chains. Speed about 200 revolutions per minute.

LIVE ROLLS.

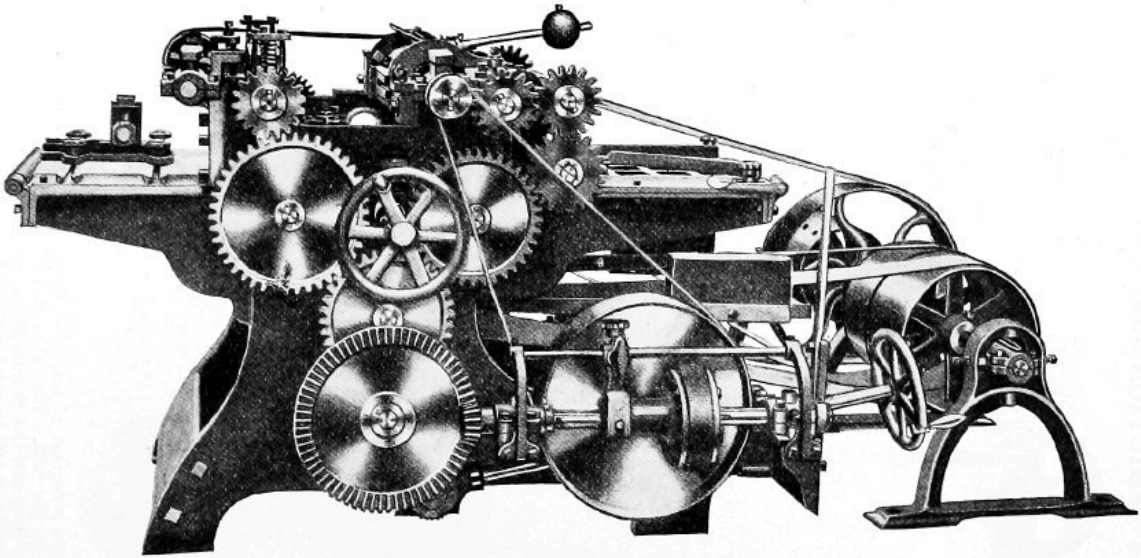


This cut illustrates a section of our Live Rolls, with double driving gear, and shows manner of erecting in the mill. We make these Rolls in two sizes, 6 and 10 inch; the 6 inch being 18 inches long and the 10 inch 24 inches long.

Set of Rolls, complete, ready to erect, with shifting device and single or double friction drive gear, including 10 rolls and 45 feet of shaft for same.

Can be furnished for right or left-hand mill.

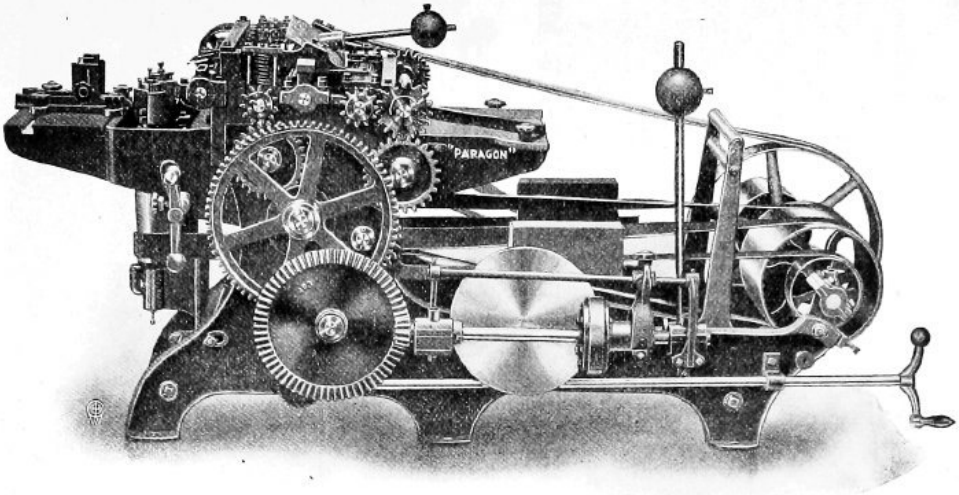
THE "MONITOR" VARIABLE FRICTION FEED PLANER.



With Matching and Moulding Attachments.

Write for full particulars and prices.

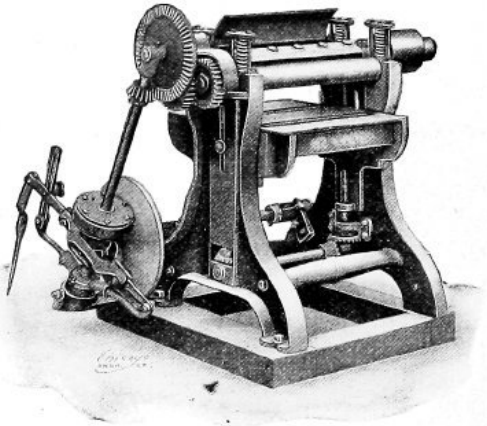
IMPROVED "PARAGON" PLANER.



With Variable Friction Feed and Matching and Moulding Attachments.

Write for Catalogue giving full description.

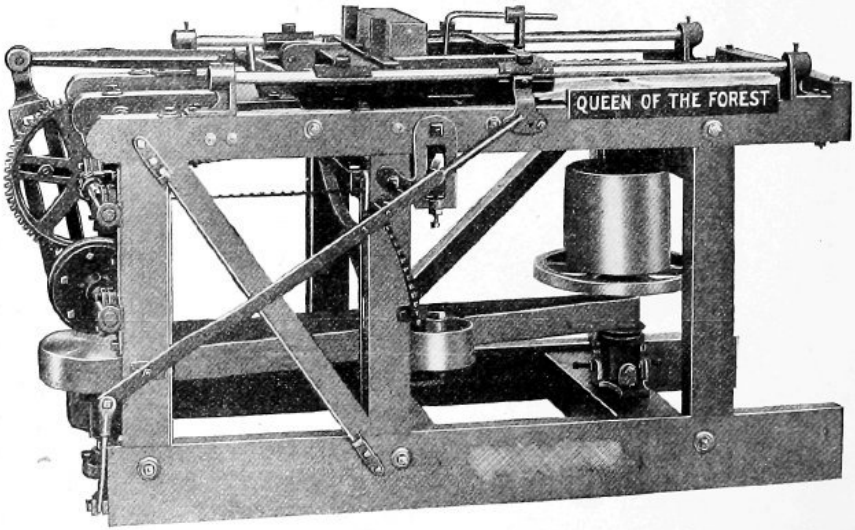
IMPROVED PONY SURFACER.



With Variable Friction Feed.

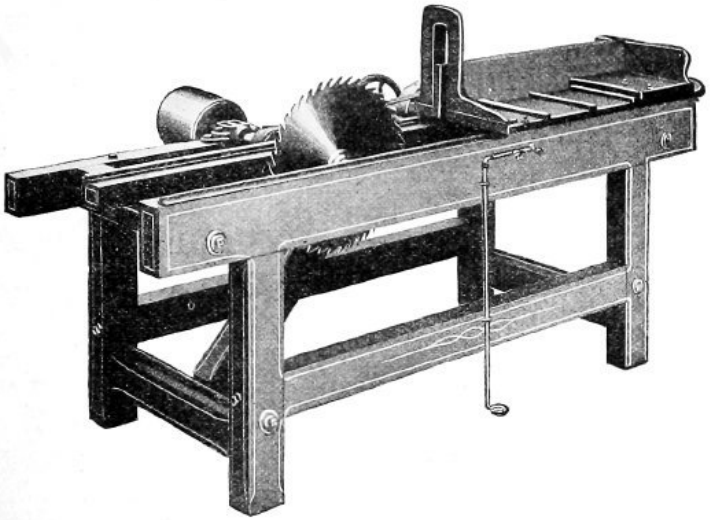
Takes lumber 20 inches wide, 6 inches thick. The two top feed rolls are 3 inches diameter and driven, the front one fluted. The two bottom rolls or idlers, 2⅞ inches diameter. The machine has Variable Friction Feed. Countershaft is furnished when desired, at extra cost. The machine is regularly fitted with two 20 inch knives. Floor space required, without countershaft, 3½x4 feet; with countershaft, 4x6 feet; weight with countershaft, 1,250 lbs; without countershaft, 1,000 lbs.

"QUEEN OF THE FOREST" SHINGLE MILL.



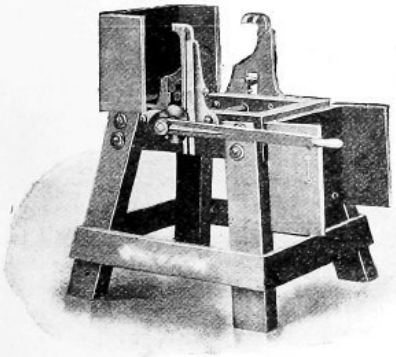
Specifications: The frame is made of Southern pine: mandrel, 1⅛ inch steel, with adjustable step and screws to regulate position of the saw, and bottom end runs in oil. The upper bearing of mandrel has oil cup, which feeds oil to the mandrel by wick. The saw is securely fastened by countersunk screws to a 24 inch collar perfectly balanced, and this collar is fitted with three large countersunk screws to smaller collar, which is shrunk on the mandrel. Size of pulley, 12 inches in diameter, 12 inch face; balance wheel, 20 inches. Feed Belt, Tightening Pulley for same and 38 inch Saw are furnished. Floor space, 37½ inches x 7 feet. Weight, 1,600 lbs.

"JACK THE RIPPER" SHINGLE MACHINE.



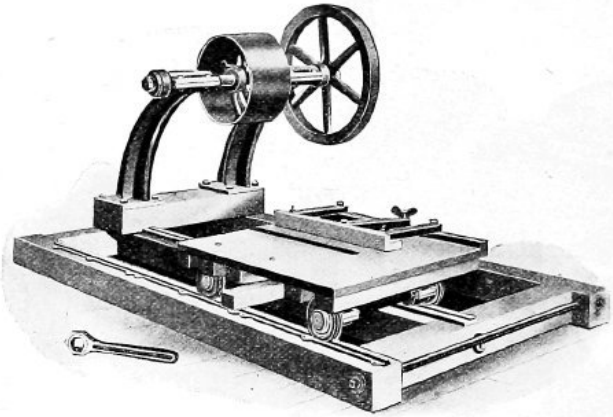
This is a Self-Feed Machine, and all that is required of the operator is to rock the block on the carriage, while he controls the feed with one foot.

SHINGLE PACKER.



A Self-Acting Trip is provided, which disengages the feed the instant the cut is made. The mandrel has pulley 8x8 inches, and should make 1,200 revolutions per minute for general work. Feed Belt, Wrench and one 20 inch Saw are furnished with each machine. Larger Saw can be furnished if desired. Capacity, 8,000 to 15,000 shingles per day. Power required, 4 to 6 horse power. Weight, 540 lbs.

IMPROVED BOLTERS.



KNEE-FEED SHINGLE BOLTER.

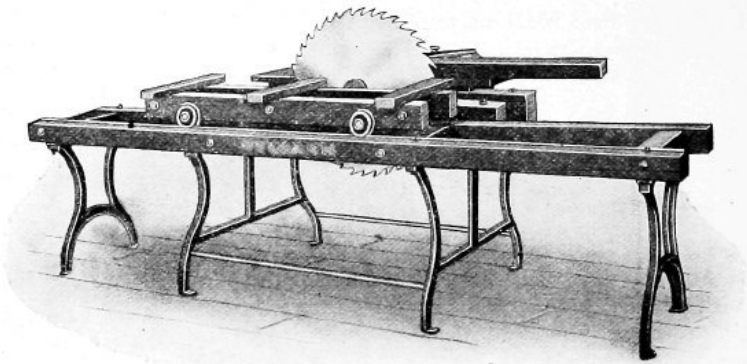
It will bolt 6,000 to 10,000 feet of logs per day.

Mandrel, 2 3/16 inches; balance wheel, 30 inches diameter; size of pulley, 16 inches diameter, 10 inch face.

Speed, 500 to 600 per minute.

Weight without saw, 1,360 lbs.; weight, with 48 inch solid saw, 1,480 lbs.

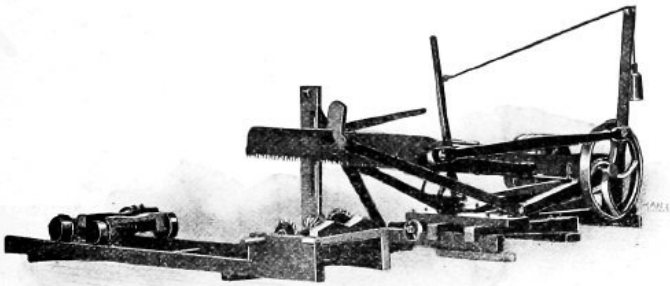
HAND-FEED BOLTER.



Carriage, 12 inches wide, 4 feet long, timbers 2x4; ¾ inch steel axles and 4 inch flanged trucks; track timbers, 3½x3½, 10 feet long; 1 1/16 inch steel mandrel, 33 inches long with 6x6 pulley. Floor space required, 5x10 feet; weight, 700 lbs. Longer or shorter carriage can be furnished, and fitted with power feed at small cost.

Will take any size saw up to 36 inches.

No. 5 DRAG SAW.



Speed—The machine should be run at a speed of 150 to 175 strokes per minute. The stroke of this machine is 34 inches. Tight and loose pulley furnished. Capacity per day, 50 to 75 cords.

Price $160 00

B. C. Drag Saw Machine, weight 750 lbs., capacity 15 to 20 cords per day ..... $ 65 00

No. 1 Champion Self Feed Drag Saw Machine, weight 1,100 lbs., capacity 30 cords per day 80 00

No. 2 Champion Self Feed Drag Saw Machine, weight 1,250 lbs., capacity 35 cords per day 90 00

No. 1 B. C. Self Feed Drag Saw Machine, weight 1,200 lbs., capacity 35 to 50 cords per day 100 00

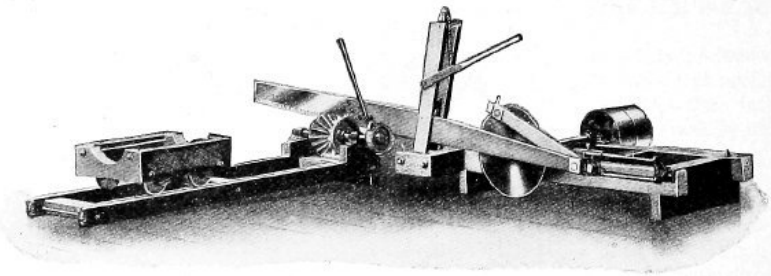
No. 3 B. C. Self Feed Drag Saw Machine, weight 1,400 lbs., capacity 40 to 60 cords per day 120 00

HORSE POWERS.

No. 2 Special, for one or two horses $35 00
No. 6 B. C. " two " four " 60 00
No. 7 Climax, " " " " " 55 00
No. 8 " " four " eight " 85 00

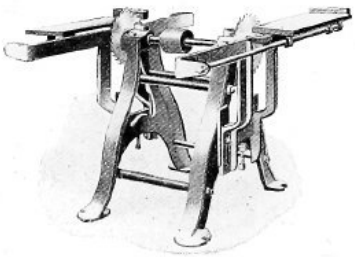
Write for discounts.

IMPROVED DRAG SAW.



The frame is made of heavy, select yellow pine timber; track is 24 feet long, in two sections; size of timbers, 3½x5½, securely braced with heavy cross pieces and secured by iron rods; stroke of saw, 28 inches; tight and loose pulleys, 20x10 inches. Connecting rod and cross head are fitted with split boxes and wrought iron straps with taper keys; guide rods are 1⅛ inch steel; cross-head is babbitted. Weight, 1,865 lbs.

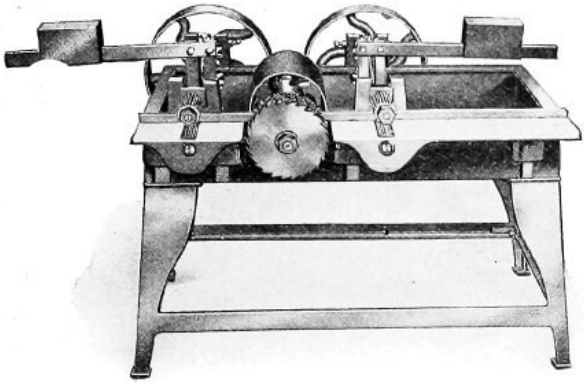
IRON FRAME DOUBLE SAW JOINTER.



The frame is made of cast iron, well proportioned and securely braced. Steel mandrel, 1⅜ inches diameter, 26 inches long over all; two bearings 6 inches long; pulley, 4 inch diameter, 3 inch face; speed, 2,000 revolutions per minute; two saws, 8 inches diameter. Weight, 360 lbs.

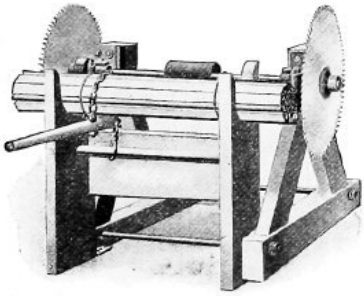
Price, with saws..... $60 00

IRON FRAME LATH MILL.



This is a very substantial machine, the frame being made entirely of cast iron; steel mandrel, $1^{11}/_{16}$ inches, run in chain oiling boxes, and has six 10 inch saws to cut $^{3}/_{8}$ inches between. Machine made to carry any number of saws desired up to six. The feed pulleys are 20x4 inches; feed rolls are corrugated and chased, which gives a very positive feed. Mandrel pulley, 10x10 inches. Weight, 840 lbs.

COMBINED LATH BINDER AND TRIMMER.

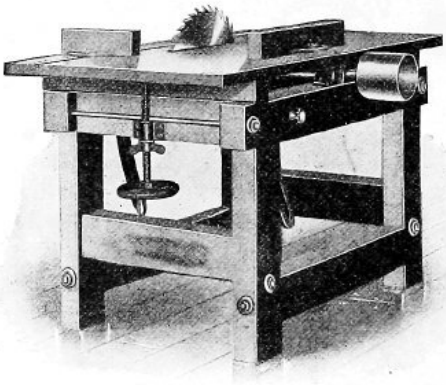


The mandrel is made of $1^{15}/_{16}$ inch steel, with pulley 6 inch diameter, 9 inch face. Speed, about 1,200. For bundles of 50 lath we furnish 24 inch saws; for larger bundles the saws are 30 inches, and of suitable gauge.

When desired, we can furnish the Lath Binder alone, without Trimmer.

Made in 2 sizes for bundles of 50 or 100, as may be desired.

COMBINATION RIP AND CUT-OFF SAW.



The top is hinged to the rear end of the frame, is adjusted by a screw and hand wheel, and is held in position by clamps wherever placed.

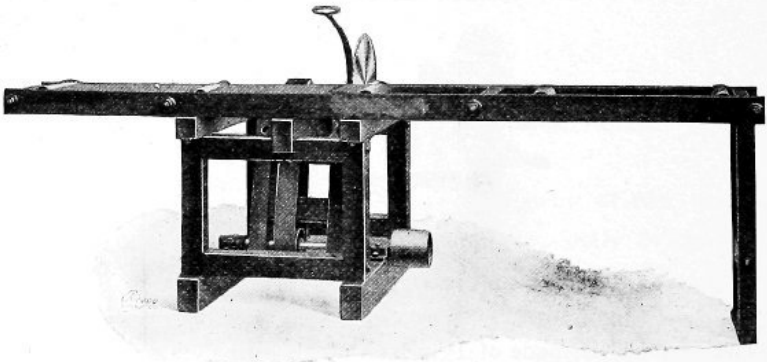
It is provided with adjustable Ripping and Cutting-off Gauges, when so ordered.

Steel mandrel, 1 7/16 inch diameter, with pulley 6 inches diameter by 6 inch face, and 16 inch rip saw.

Larger or smaller Saw can be furnished, when desired; also, an extra Saw for cutting off.

Weight of machine, complete, 375 lbs.

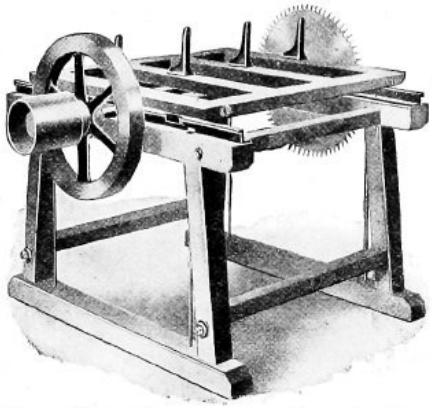
THE IDEAL CUT-OFF MACHINE.



The frame is made of 3½x3½ timbers; track made of 2x4 timbers, 10 feet long, with five 3 inch idle rollers; mandrel, 1 7/16x20 inches, fitted with 20 inch Cut-off Saw with 1¼ inch hole; Pulley, 4x4; Countershaft, 1 7/16 inches, 34 inches long; Pulley to drive saw, 6x4; Receiving Pulley, 6x6.

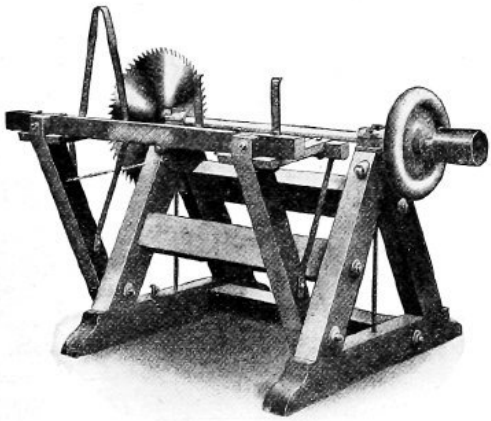
Weight of machine, complete, as shown above, 380 lbs.

THE SLIDE TABLE CORD-WOOD MACHINE.



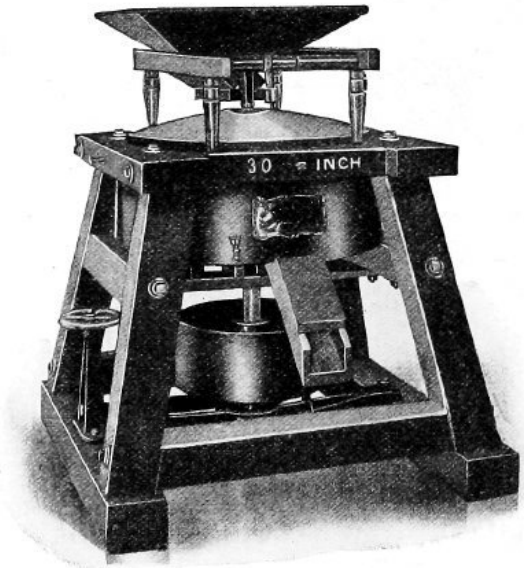
5 feet long; made to take any size saw from 20 to 30 inches, with 1¼ or 1⅜ inch eye (20, 22, 24 or 26 inch saws have 1¼ inch eye; 28 and 30 inch have 1⅜ inch eye). Babbitted boxes, 4½ inches long; drive pulley, 6x6 inches; balance wheel, 20 feet diameter; track iron has extra wide face, planed top and bottom; guides under table are arranged so that they can not leave the track. Furnished with or without Saw, as desired.

COMBINATION CORD-WOOD SAW.



The Frame is made of select yellow pine, mortised and securely braced with iron rods. The mandrel is made of 1⅛ inch cold rolled steel, ground and polished; is 5 feet long, fitted with 5 inch saw collar, to take saw from 20 to 30 inches, with 1¼ or 1⅜ inch eye (20, 22, 24 and 26 inch saws have 1¼ inch eye; 28 and 30 inch have 1⅜ inch); balance wheel 20 inches diameter. The mandrel boxes are self-oiling, are extra long, babbitted with the best metal, and fitted with the utmost care. The mandrel pulley is 6 inches diameter and 6 inches face.

PORTABLE CORN AND BUHR MILLS.



SPECIFICATIONS OF UNDER RUNNER MILLS.

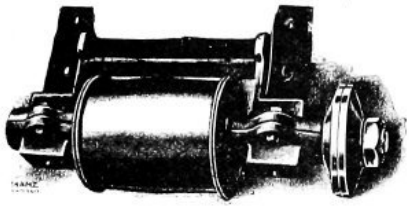
Diameter of Stone.	Horse Power.	Capacity Bushels Per Hour.	Speed Revolutions Per Minute.	Size Pulley Diameter.	Size Pulley Face.	Weight Pulley Mill.	Weight Geared Mill.
18 in.	2 to 6	4 to 8	450	12 in.	8 in.	780 lbs.	950 lbs.
20 "	4 " 6	6 " 10	450	14 "	8 "	850 "	1,000 "
24 "	6 " 10	10 " 15	400	18 "	8 "	1,000 "	1,200 "
30 "	10 " 15	15 " 25	350	20 "	10 "	1,600 "	2,000 "
36 "	15 " 30	25 " 40	325	24 "	10 "	2,000 "	2,400 "

TOP RUNNER GEARED MILLS.

Diameter of Stone.	Horse Power.	Capacity Bushels Good Meal Per Hour.	Revolutions Per Minute.	Size of Pulleys.		Size Mitre Gears on Geared Mills.		Weight Pulley Mill.	Weight Geared Mill.
				Diameter.	Face.	Diameter.	Face.		
30 in.	4 to 8	4 to 6	200 to 250	20 in.	8 in.	16 in.	3½ in.	2,580 lbs.	2,950 lbs.
36 "	8 " 12	8 " 10	150 " 200	24 "	10 "	20 "	4 "	3,500 "	3,850 "
42 "	12 " 20	10 " 16	150 " 190	30 "	12 "	24 "	5 "	5,200 "	5,700 "
48 "	15 " 30	15 " 25	140 " 180	36 "	12 "	24 "	5 "	6,500 "	7,200 "

SAW MILL MACHINERY.

SWING SAW MANDRELS.



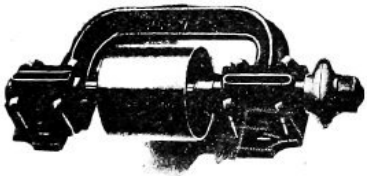
To determine proper speed of any Circular Saw, divide 42,000 by diameter of Saw in inches.

Number	Proper Size of Saw.	Diameter Arbor.	Diameter Saw Seat.	Arbor Pulley Diameter.	Arbor Pulley Face	Diameter Saw Collar.
2	22 to 32	1 7/16	1 3/8	6	7	5" Cast Iron
4	34 to 46	1 15/16	1 1/2	8	9	9" Steel
6	48 to 60	2 3/16	2	9	11	9" Steel

Furnished to swing from above or below

SWING SAW HINGES.

Hinge has 3¼" hole, surrounds but does not bear on shaft. Has two oil cellars so that Hinge may be on top of timber or under timber, as most convenient. Means of adjustment in Hinges to properly line up Saw.



Cast Steel Circular Saw Mandrels.

STANDARD.

Cast Steel Yoke Mandrels.

No.	Hole in Saw.	Size of Saw. Inches.	Size of Mandrel.	Diameter of Collars.	PULLEY. Diameter.	PULLEY. Face.	Length of Frame. Standard.	Out to Out Boxes. Yoke.	C to C of Bolt Holes. Standard.	C to C of Bolt Holes. Yoke.
1	¾	5 to 10	13/16	2½	3	3¼	13¾	14	10¾	10
2	1	12	1 1/16	3	4	4½	15¾	16	12⅝	11½
3	1⅛	14 to 18	1 3/16	3½	5	5½	18½	20	15	15
4	1¼	20 to 24	1 5/16	4	6	6½	18½	20	15	15
5	1⅜	26 to 28	1 7/16	4½	7	7½	19½	20	15¼	15
6	1½	30 to 36	1 9/16	5	8	8½	19½	20	15¼	15

HAND-FEED EDGER.

Specifications: Saw 20", 10 gauge; arbor 1 6/16" diameter, 18" long, 1¼ saw seat, runs in heavy cast iron yoke frame; pulley 6" diameter, 6½" face; carriage 16' long, 22" wide, made of 2" strips and 2" spaces, so that boards may be cut parallel and to dimension without any gauges; wheels 6" diameter, same as used on small saw mills; wheels on axles running in self-oiling boxes; trackway in three 12' lengths, iron legs.

Each section is 12' long with track in place. In shipping legs are separate. Each machine is completely set up, and then knocked down to ship.

This is a machine far superior to the ordinary hand-feed edger in weight and design.

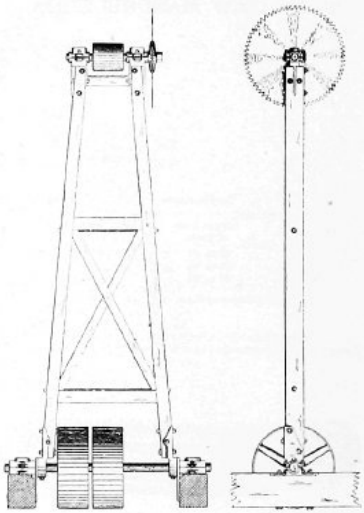
Attention is called to the large-sized wheels under carriage and the improved table and carriage which makes it easy to cut parallel boards without any measuring.

Irons only can be furnished when desired, comprising saw, arbor, trucks, track and bolts, but no legs.

SAW MILL MACHINERY.

WOOD FRAME SWING SAW.

Cut A. Swing Saw, no Counter.



Above cut shows machine with present details, swinging from below, driven from a short countershaft of its own.

Cut B. Swing Saw, with Counter.

Note—Since cut A was made, we have completely redesigned the details of our Wood Frame Swing Saws, greatly improving them.

The cut A shows a No. 2 Machine with frame of 3½ x 3½ timbers. These timbers are now 5½ x 2½, making a much stiffer frame.

Hinge—has 3½" hole, surrounds but does not bear on shaft. Has two oil cellars so that hinge may be on top of timber or under timber, as most convenient. Means of adjustment in hinges to properly line up saw.

Frame or Ladder of seasoned yellow pine, mortised, braced and bolted. Bolts pass both ways through the timbers where bolted to Hinges and Arbor Frame. Size of timbers may be varied to suit length, etc.

SPECIFICATIONS.

Arbor Frame a stiff casting, with both boxes for arbor cast on. Boxes arranged so that they may be properly oiled when swinging either from above or below.

Length of Frame or Ladder **to order**, and should always be specified.

6 foot wood frame will be furnished unless otherwise specified.

If no Wood Work or Ladder is required, the complete irons, as shown in cut, including all bolts, can be furnished.

No Saw or Belt furnished unless specified.

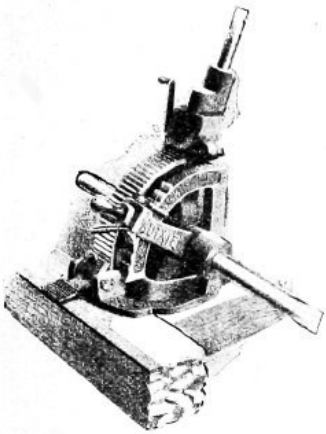
A Right Hand Thread on arbor furnished unless otherwise ordered.

Number.	Proper Size of Saw.	Diameter Arbor.	Diameter Saw Seat.	Arbor Pulley.		Diameter Saw Collar	Drive Pulley.		Timbers of Frame.
				Diam.	Face.		Diam.	Face.	
2	18 to 32"	1 7/16"	1 3/8"	6"	7"	5"	20"	7"	5½ x 2½
4	34 to 46"	1 15/16"	1½"	8"	9"	9"	24"	9"	5½ x 3½
5	48 to 60"	2 5/16"	2"	9"	11"	9"	24"	11"	7½ x 3½

No. 2, Cast Iron Collars shrunk on. No. 4, Cast Steel shrunk on. No. 5, Forged Steel welded on. Nos. 4 and 5 Pulleys are double flanged, with device to keep oil off of belt.

SAW MILL MACHINERY.

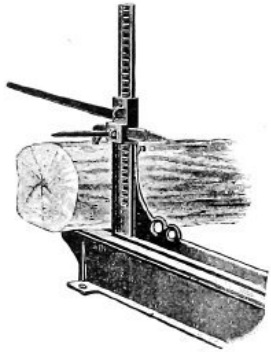
DIXIE SET WORKS.



Set Works. We have greatly improved our Dixie set works. The Ratchet Wheel is 14' in diameter and made of chilled iron, cast in a special iron mould, which is cut on automatic milling machine, thus insuring an accurate wheel. This is absolutely necessary for making perfect lumber. The pawls for working in the ratchet wheel are made of tempered saw steel and in a number of parts. By reversing the pawls, the blocks can be receded by the set lever.

The set arch as now made is a segment of a ratchet, with an arm swinging on the set shaft, which has a pawl engaging in the set arch. This arm acts as a stop to the set lever. To change the thickness of the cut it is only necessary to move this arm forward or backward, which is done in an instant. There is also adjustment provided for wear. This is a big improvement over the pin in arch which is hard to change, and has no adjustment.

IMPROVED DIXIE MILL DOG.



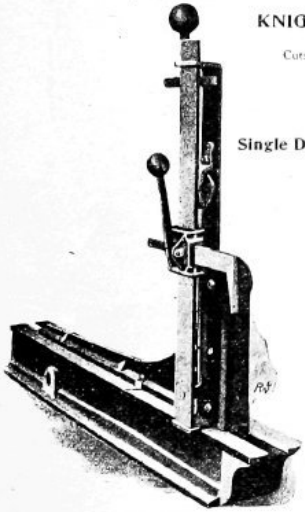
Shipping Weight, 60 Pounds.

The above cut shows our improved Dixie Dog, as applied to our small head blocks. The Dog holds very tight, even to the last cut, is perfectly adjustable, and simplicity itself in operation. Can be put on any make block with slight cost, by boring and tapping two holes.

Send us an impression of your knee and we will drill and tap holes in dog free of charge, so that only two holes will have to be drilled in each knee.

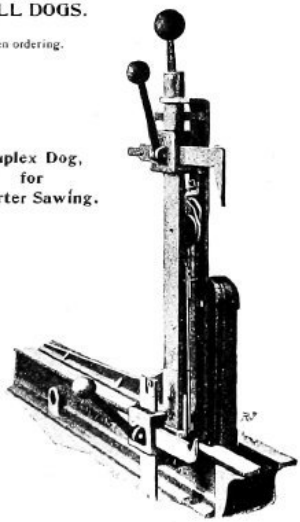
KNIGHT'S PATENT SAW MILL DOGS.

Cuts show left-hand dogs. Specify hand when ordering.



Single Dog.

Duplex Dog, for Quarter Sawing.



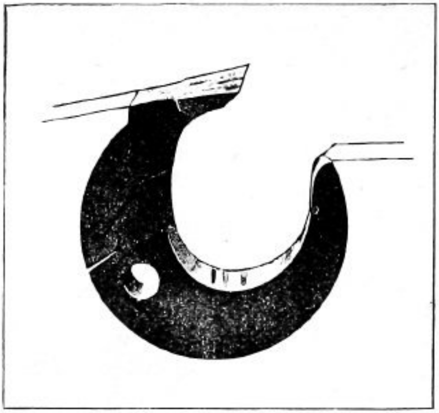
Single dogs are made entirely of steel, including the Dog Head, so that there is no part about it which can break. They can be used for all classes of standard sawing.

The Duplex Dog is used principally for quarter sawing, and is entirely of steel, with the exception of the heads, which are cast iron. We can furnish steel heads at an additional cost.

Either of these dogs can be attached to any make of knee. If pattern of knee is sent in, holes drilled and bolts furnished for attaching.

	Height.	Size of Upright Bar.	Weight Per Pair.	Price Per Pair.	Price Single Dog.
Single Dog.	40 inches.	3 inches Wide, ⅜ inch Thick.	160 Pounds.	.....	.....
Duplex Dog.	46 inches.	3 inches Wide, ⅝ inch Thick.	230 Pounds.	.....	.....

CIRCULAR SAWS.



No. 2 TOOTH—Full Size.

PRICE LIST OF PATENT INSERTED-TOOTH SAWS.

Diameter, Inches.	Standard No. of Teeth No. 3.	Price, No. 3.	Standard No. of Teeth No. 2.	Price, No. 2.	Greatest No. Teeth that can be put into a Saw. No. 2.	No. 3.	Extra for Each Gauge. (Heavier.)
12	10	$18 00	10	$21 00	12	10	$0 17
14	10	21 00	12	25 00	14	10	21
16	12	24 00	14	29 00	16	12	25
18	14	27 00	16	34 00	18	14	30
20	14	31 00	18	39 00	20	16	35
22	16	35 00	18	44 00	24	16	45
24	18	39 00	22	49 00	26	18	55
26	18	43 00	22	55 00	28	20	65
28	20	47 00	24	61 00	30	22	80
30	20	52 00	26	68 00	32	24	90
32	22	57 00	28	75 00	34	26	1 00
34	22	63 00	30	82 00	36	26	1 20
36	24	69 00	30	89 00	38	28	1 40
38	24	75 00	32	98 00	42	30	1 75
40	26	81 00	32	107 00	44	32	2 40
42	28	88 00	34	116 00	46	34	2 60
44	30	95 00	36	125 00	48	36	3 00
46	30	105 00	38	136 00	50	38	3 50
48	32	110 00	40	148 00	50	38	4 00
50	34	122 00	40	160 00	52	40	4 50
52	36	140 00	42	175 00	54	42	5 00
54	38	160 00	46	192 00	56	44	6 00
56	40	180 00	50	215 00	58	44	7 00
58	42	210 00	52	240 00	60	46	8 00
60	42	230 00	56	270 00	62	48	9 00
62	44	250 00	60	300 00	64	50	10 00
64	44	275 00	64	335 00	66	52	12 00
66	48	305 00	68	370 00	68	54	15 00
68	48	325 00	72	410 00	72	56	18 00
70	52	360 00	72	450 00	74	60	21 00
72	52	400 00	74	500 00	76	62	24 00

Each saw is sent out with six sets of bits and two extra holders and one wrench with each order. Number of teeth in accordance with number listed. These saws are made either 8 or 10 gauge only.

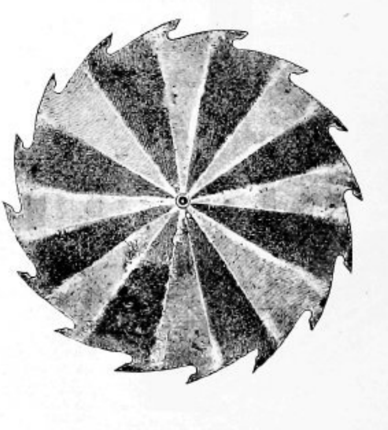
We will furnish 10 per cent more teeth in saws than are listed without extra charge. After these additional teeth are furnished, each tooth will be $1.50 extra.

SOLID TOOTH CIRCULAR SAWS.

MACHINE GROUND AND TEMPERED

Made of best selected Cast Steel, extra quality. Workmanship unequaled.

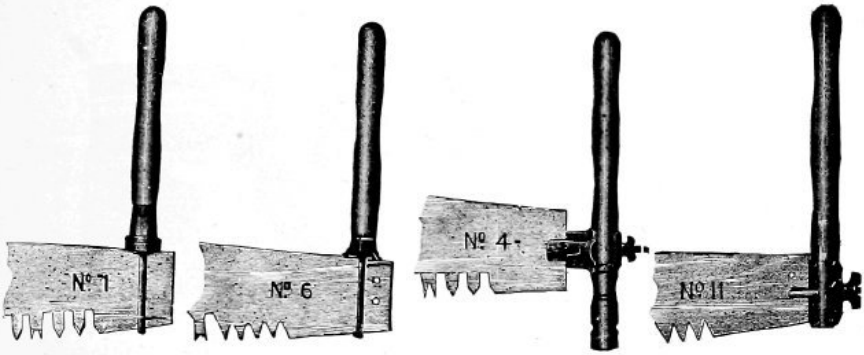
Diameter, Inches.	Thickness, Gauge.	Size of Hole, Inches.	Price Each.	Extra for each Addit'l Gauge. (Heavier.)	Price for Beveling New Saws, per Gauge.
4	19	¾	$1 10	$0 03	$0 14
5	19	¾	1 30	04	16
6	18	¾	1 55	05	18
7	18	¾	1 85	06	20
8	18	⅞	2 20	08	22
9	17	⅞	2 75	10	24
10	16	1	3 30	12	28
11	16	1	3 80	14	30
12	15	1	4 15	17	35
14	15	1⅛	5 00	21	40
16	14	1⅛	6 00	25	50
18	13	1⅛	7 50	30	60
20	13	1¼	9 00	35	70
22	12	1¼	11 00	45	80
24	11	1¼	13 00	55	90
26	11	1¼	15 00	65	1 05
28	10	1⅜	17 00	80	1 20
30	10	1⅜	19 00	90	1 30
32	10	1½	22 00	1 00	1 40
34	9	1½	25 00	1 20	1 55
36	9	1⅝	28 00	1 40	1 70
38	9	1⅝	31 00	1 75	1 85
40	9	2	36 00	2 00	2 00
42	8	2	42 00	2 50	2 20
44	8	2	50 00	3 00	2 40
46	8	2	60 00	3 50	2 60
48	8	2	70 00	4 00	2 80
50	8	2	80 00	4 50	3 00
52	8	2	90 00	5 00	3 25
54	8	2	100 00	6 00	3 50
56	8	2	115 00	7 00	3 75
58	8	2	130 00	8 00	4 05
60	8	2	145 00	9 00	4 35
62	8	2	160 00	10 00	4 65
64	8	2	180 00	12 00	5 00
66	8	2	200 00	15 00	5 35
68	8	2	225 00	18 00	5 75
70	8	2	255 00	21 00	6 15
72	8	2	290 00	24 00	6 55
74	8	2	330 00	27 00	7 00
76	8	2	375 00	30 00	7 50



All Circular Saws beveled one gauge, without extra charge. No extra charge for Saws one gauge thicker than list.

Saws 48 inches in diameter and larger, thinner than ten gauge, add ten per cent. for each gauge thinner, and no warrant. Saws to cut metal 50 per cent. advance on this list. When ordering Circular Saws always specify whether Rip or Cross-cut, and give size hole. On orders for *Circular Log Saws* it is necessary to have complete description.

Cross-Cut Saw Handles



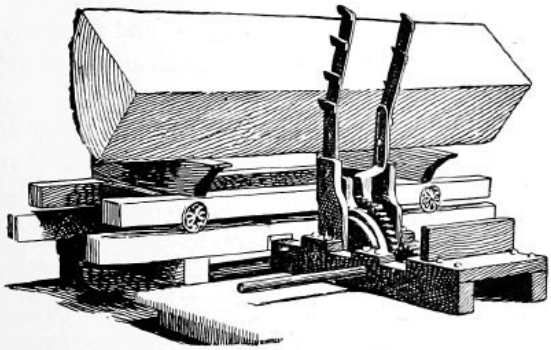
No. 1 Loop — List Price, per pair, 30 cts.

No. 6 Loop — List Price, per pair, 16 cts.

No. 4 Reversible — List Price, per pair, 30 cts.

No. 11 Reversible — List Price, per pair, 15 cts.

EDWARDS LOG TURNER.



Made in Two Sizes.

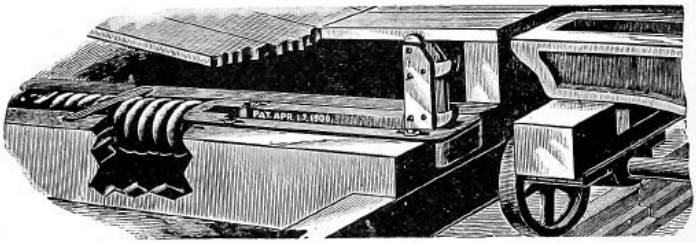
No. 1. Weight complete 600 lbs.
Price.....$150 00

No. 2. Weight complete 700 lbs.
Price.....$190 00

With every machine we furnish all the attachments, which is more than half the expense. The following is a list of machine and fixtures:

1 Edwards Log Turner.
1 26 inch Wood Split Friction Pulley.
1 18 " Iron Friction Pulley.
1 6 " Wood Reverse Friction Pulley.
1 16 " Bevel Gear.
1 5 " " Pinion.
16 feet 1½ inch Round Steel Shafting.
3½ " 1½ " " " "
1 Set Hangers for Boxes and Gears.
1 Angle Bar.
1 Reverse Lever.
Bolts, Keys and everything complete for attachments.

SELF-ADJUSTING FLOOR PLATE.



For Double Cylinder Steam Niggers.

The Floor Plate is an open-hearth annealed **Steel** casting, and we guarantee that it cannot be broken.

With this plate in use, your nigger will always be in repair—no broken tooth-bars, floor plates or pins. It cushions on the forward and backward throw, and with a forward pressure, a log can be turned which could not be touched when using the old rigid plate.

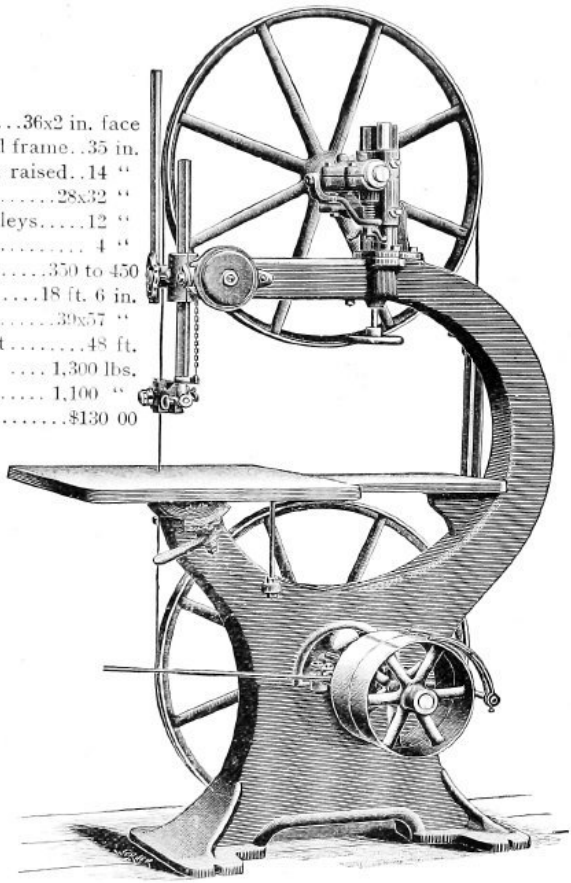
In ordering select from table below, the measurements corresponding to the dimensions of your tooth-bar and width of opening in floor plate. If your measurements do not correspond with those of table, give width of tooth-bar, also width and length of tooth from face of bar.

No.	TOOTH-BAR.			FLOOR PLATE.
	Thickness of Sides.	Width of Tooth.	Length of Tooth.	Width of Opening.
1	1	1¼	3 to 3½	4
2	1¼	1¼	3 " 3½	4½
3	1	2	3 " 3½	4½
4	1¼	2	3 " 3½	5
5	1	3	3 " 3½	5½
6	1¼	3	3 " 3½	6
7	1	4	3 " 3½	6½
8	1¼	4	3 " 3½	7

Price.....$40 00

36 INCH BAND SAW.

Size of band wheels.....36x2 in. face
Distance clear between saw and frame..35 in.
Height clear under guide, when raised..14 "
Size of table (iron).....28x32 "
Diameter of tight and loose pulleys.....12 "
Width of belt to use..... 4 "
Speed, revolutions per minute.....350 to 450
Length of saw blade.....18 ft. 6 in.
Floor space required, over all.....39x57 "
Cubic measure, boxed for export.....48 ft.
Gross weight, " " " ....1,300 lbs.
Net " .....1,100 "
List price of machine.....$130 00

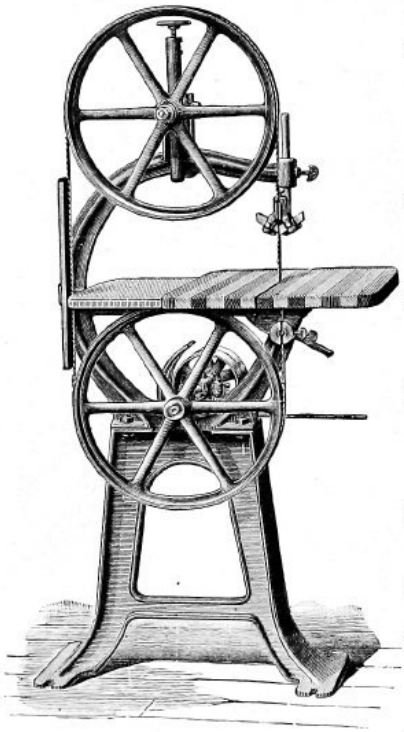


Regular Equipment. — The following items are included with each machine, and need not be mentioned in ordering: One Wrights guide above table. One brazing clamp. One brazing tongs. One saw blade, set, filed and joined ready for use, ¾ in. wide. (Customers may have choice of any width blade up to 1 in.)

BAND SAW BLADES.

Saw.	Length.	¾ inch.	⅞ inch.	1 inch.	⅞ and 1¼ in.	1 inch.
20 in.	10 ft. 1 in.	$1 50	$1 50	$1 75	$2 25	$2 65
36 "	13 " 9 "	1 90	2 00	2 25	2 85	3 30
32 "	16 " 5 "	2 25	2 40	2 65	3 35	4 00
36 "	18 " 6 "	2 45	2 65	2 85	3 65	4 35

Prices are for best quality saw blades, joined, set and filed ready for use.



DESCRIPTION.

Dimensions—Height, 66 inches. Floor to top of table, 40 inches. Table to upper saw guide when up, 7 inches. Saw to frame at back of table, 20 inches. Band wheels, 20 inches diameter. Floor space, 24x24 inches.

Saw Blades—We furnish two saws with each machine—¼ and ⅜, No. 22 gauge, 10 feet 1 inch long, set and sharpened ready for use.

Pulleys—Tight and loose, 7 inches diameter for 3 inch belt, provided with shifter and lever, as shown; no countershaft required.

Foot Power—When wanted we will fit the machine with foot-treadle and gearing, thus converting it to a foot-power machine. The treadles are arranged for one or two men.

Table—20x24 inches, can be **tilted** to any desired angle for **bevel sawing.**

Shipping Weight—300 lbs.

Speed—350 to 400 revolutions per minute.

SIZE AND PRICE.

20 inch Machine, with tight and loose pulleys $50 00
Extra Saw Blades, 10 feet 1 inch x ¼ or ⅜ inch.....each, 1 50
20 inch Machine with gearing and foot treadles for one or two men, no pulleys 60 00
20 inch Machine with foot power attachments and pulleys for foot or belt power..... 65 00
Extra Saw Blades, 10 feet 1 inch x ¼ or ⅜ inch.....each, 1 50

Write for Band Saw Catalogue,

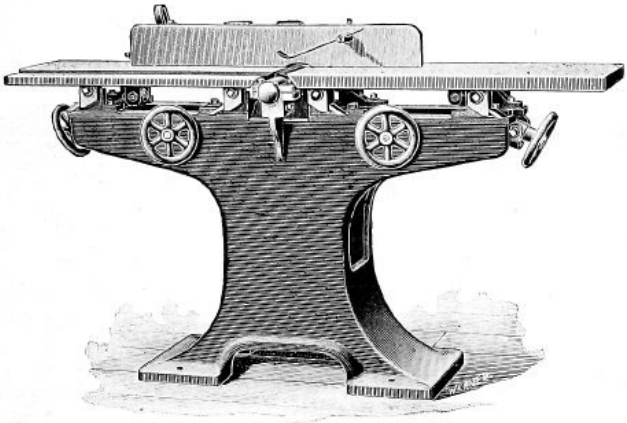
We give below size and price of Regular Iron Frame Iron Table Band Saws, which for description and style, except as to size, are the same as 36 inch machine shown on page 747.

SIZE AND PRICE.

26 inch Machine, with tight and loose pulleys.....$ 80 00
26 inch Machine, with foot treadles for one or two men, including pulleys..... 90 00
Extra Saw Blades, 13 feet 9 inches x ⅜ inch.....each, 2 00
32 inch Machine, with tight and loose pulleys..... 105 00
Extra Saw Blades, 16 feet 5 inches x ½ inch.....each, 2 65

PONY JOINTER.

12, 18 and 24 Inch.



The Front Table is 42 inches long; the rear table is 36 inches long, and is arranged for rabbeting.

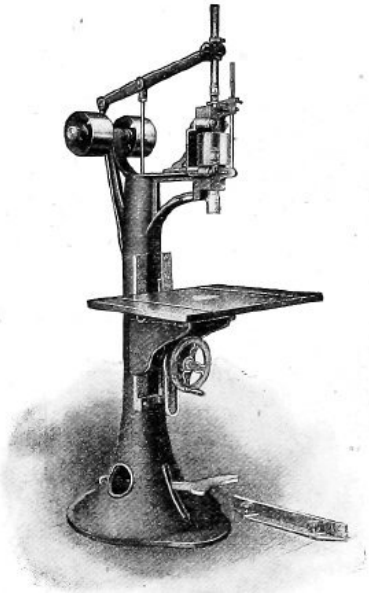
The Fence can be set to any angle from 90° to 45° and can be moved to any position across the table. It is furnished with one pressure spring to hold the work to the table.

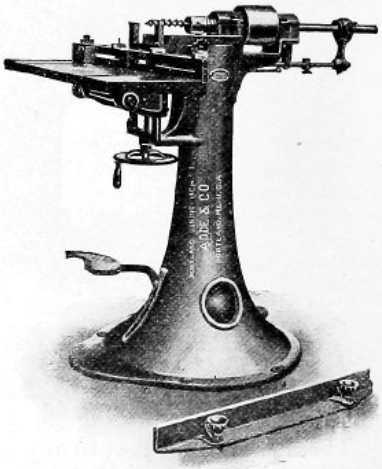
The Head is milled from a solid bar of steel, and is furnished with two knives of best quality. Two sides of the head are grooved with T-slots for attaching special cutters.

A Countershaft is also furnished, having tight and loose pulleys 10 inches diameter and 5 inches face. Speed of countershaft 800 to give the machine a speed of 4,000 revolutions per minute. Pulley on head is 4 inches diameter, for 4 inch belt.

	12 Inch.	18 Inch.	24 Inch.
Floor space required, over all	31x80	37x80	43x80
Cubic measure, boxed for export	40 ft.	48 ft.	56 ft.
Gross weight " " "	1,500	1,775	2,000
Net weight	1,250	1,450	1,650
List price for machine	$150 00	$170 00	$190 00

PORTLAND BORING MACHINES.





VERTICAL.

The table is of iron, 20x30 inches, with wooden center, and is operated by means of a hand-wheel connected with accurately cut composition mitre gears.

We build these machines in two styles —No. 3, Plain; No. 4, Universal.

The No. 3 style has only a vertical table adjustment of 12 inches, while the Universal No. 4 is furnished with a table that, besides having vertical adjustment, will tilt 45 degrees to left and right as well as tilt 45 degrees forward.

No. 3. Price..... $120 00
No. 4. " 165 00

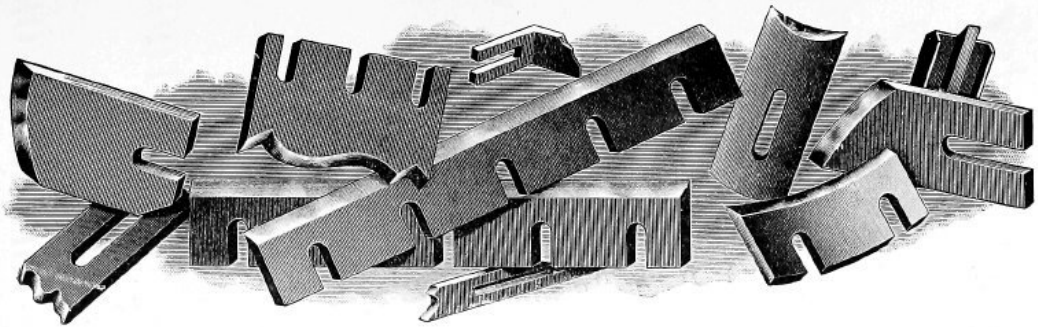
HORIZONTAL.

To meet different requirements we build two styles of Horizontal Borers—No. 1, Plain; No. 2, Universal, which are identically the same with the exception of the table adjustment.

Both have a 10x30 inch table, but on the Plain Machine it has only a vertical adjustment of 7 inches, while on the Universal Borer the table swings 45 degrees to left and right as well as tilts 45 degrees upward.

No. 1. Price..... $105 00
No. 2. " 115 00

MACHINE KNIVES.



PRICE LIST MACHINE KNIVES.

Planing Machine Knives and Other Ordinary Straight Knives of Same Finish ⅜ of an Inch Thick or Less.

PRICES PER INCH.	Over 6 to 31 long.	Over 31 to 40.	Over 40 to 50.	Over 50 to 60.	Over 60 to 70.
4 inches wide or less	$0 13	$0 15	$0 17	$0 20	$0 23
Over 4 to 4½ inch	16				
" 4½ " 5 "	20				
" 5 " 5½ "	23				
" 5½ " 6 "	26				
" 6 " 6½ "	29				
" 6½ " 7 "	32				
" 7 " 7½ "	35				
" 7½ " 8 "	38				

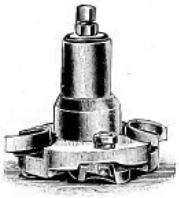
Figure prices at actual measurement, viz.: 24⅛, 50⅛, etc. Knives wider in one place than another, or thicker in one place than another must be figured by list, of widest and thickest measurement. Knives must also be measured by longest length, whether it be at cutting edge or back.

ALL KNIVES longer or wider than are included in this list (unless otherwise provided for under another heading) shall be classed as special and charged for by the Special List.

Advance for Extra Thickness on All Knives:

Over ⅜ to 7/16 thick 10 per cent.
" 7/16 " ½ " 15 " "
" ½ " ⅝ " 20 " "
" ⅝ " ¾ " 25 " "

Over ¾ to ⅞ thick 30 per cent
" ⅞ " 1 " 35 " "
" 1 " 1¼ " 50 " "
" 1¼ " 1½ " 75 " "



No. 22.

No 23.

Matcher Heads in Solid Section.

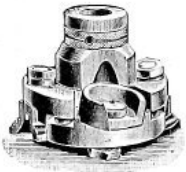
No. 202.

No. 203.

Matcher Heads with Expansion.

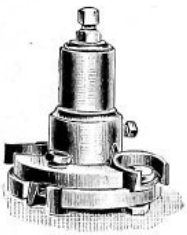
No. 84.

Expansion Door Head.



No. 206.

Expansion Sash Head.



No. 38.

No. 39.

Ship Lap Heads in Solid Section.

The Shimer Cutter Heads

TO MATCH

FLOORING,

CEILING,

SIDING,

WAINSCOTING,

SHIP LAP,

O. G. BATTEN,

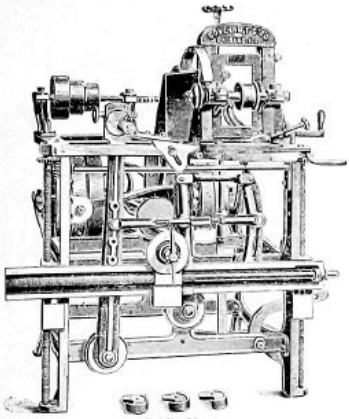
JOINTING, Etc.

ALSO

SPECIAL TOOLS FOR SPECIAL WORK

WRITE FOR PRICES

Improved Automatic Sharpener



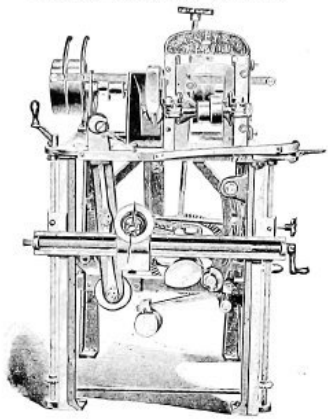
Cut No. 55.

FOR CIRCULAR RIP SAWS FROM 12 TO 72 IN.

This is the most complete Circular Saw Sharpener ever made and the only one that will sharpen all kinds of inserted tooth saws complete without removing the points. Pulleys on countershaft are 12x2½ in. Belt. Speed, about 200 revolutions per minute. Weight, 850 lbs. Floor space 4x4 ft. Extreme height 4 ft. 10 in. Size of emery wheel used, 12 in. in diameter, 15-16 hole.

Price $175.00

Automatic Circular Saw Sharpener.



Cut No. 71.

This machine is made especially for sharpening Raft Saws from 12 in. to 30 in. in diameter.

Pulleys on countershaft are 9 in. x 2½ in. belt.

Speed 800 revolutions per minute.

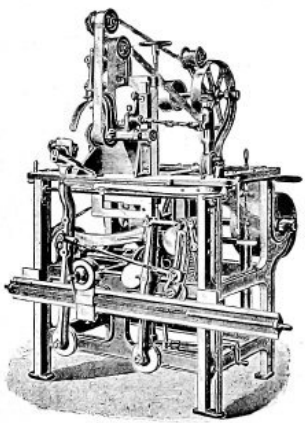
Size of emery wheel used, 10 in. in diameter, 15-16 hole.

Weight, 600 lbs. Floor space 3 ft. 8 in. x 3 ft. 1 in. Extreme height 5 feet.

Price $100.00

Automatic Circular Saw Sharpener.

For Rip and Cross Cut Saws from 16 to 72 in.



Cut No. 90.

Saws can be gummed and sharpened automatically. Only a slight change is necessary from one style of saw to the other. Will bevel both front and back of teeth on cross cut saws, and will be shipped in this way unless otherwise ordered, but if desired can be made to bevel the front of tooth and leave the back square, or square on front and bevel on back. Only one device is furnished with each machine.

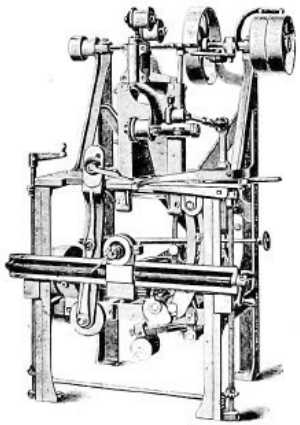
In ordering state plainly which device is wanted. Pulleys on countershaft are 14 in. diameter, 4 in. face. Speed about 185 revolutions per minute. Size of emery wheel used 12 in. diameter, 15-16 holes. Thickness to suit the size of saw teeth. Weight of machine about 1450 lbs.

Price $200.00

Blower for machine will be furnished if so ordered at an extra cost of $20.00.

Floor space 48 in. x 5[illegible] in. Extreme height 6 ft. 3 in.

Automatic Sharpener For Circular Saws.



Cut No. 85.

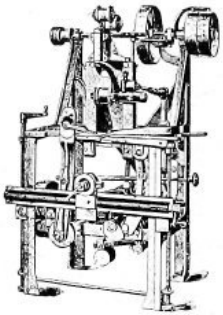
This machine is constructed especially for Cross Cut and Rip saws. It will sharpen Cross Cut Saws from 8 in. to 44 in. in diameter, and Rip Saws from 12 in. to 48 in. in diameter, and both right and left hand shingle saws without removing the flanges.

The advantage this machine has is that it will sharpen the front of the tooth to any desired bevel or angle and leave it straight on the back. In this way it makes a very strong and rapid cutting tooth. Pulleys on countershaft are 9 in. x 2½ in. Speed about 475 revolutions per minute. Size of emery wheel used 10 in. in diameter; 15-16 hole.

Weight 740 lbs. Floor space 3 ft. 2 in.x2 ft. 10 in. Extreme height 5 feet.

Price $150.00

Automatic Sharpener for Circular Saws.



Cut No. 10.

This machine is constructed especially for use in factories where small circular saws are used both cross cut and rip saws. It will keep the saws perfectly true and ground even at all times. Saws sharpened on an automatic sharpener of this kind will do more and better work by far than saws sharpened by hand sharpener or by filing. Then, there is a big saving in files, as emery wheels cost but little compared with files. This machine will sharpen cross cut saws from 6 in. to 22 in. and rip saws from 8 in. to 24 in. in diameter. It sharpens cross cut saws bevel on both sides of the teeth and will sharpen rip saws square so they can be swaged if desired, but a little bevel is very desirable on rip saws if spring set.

Pulleys on countershaft are 5½x1½ in.

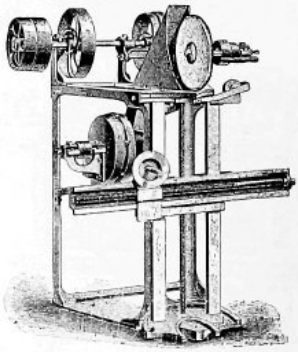
Speed of countershaft about 600 revolutions per minute.

Size of emery wheel used 8 in. diameter, ⅝ hole, thickness to suit size of saw teeth.

Weight 300 lbs. Floor space 28x29 in. Extreme height 39 in.

Price $75.00

Hand Sharpener and Gummer.



Cut No. 7.

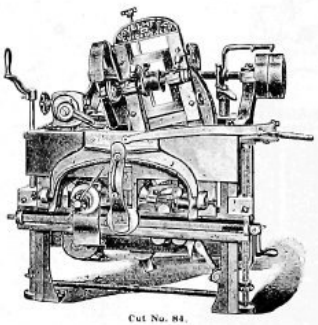
For Circular Rip or Cross Cut Saws.

Will sharpen saws from 12 in. to 72 in. diameter, any shape or size of saw teeth. Pulleys on countershaft are 9 in. x 2½ in. belt. Speed about 550 revolutions per minute. Size of emery wheel used 12 in. diameter 15/16 hole. Thickness to suit saw teeth.

Weight 550 lbs. Floor space 3 ft. 7 in. x 3 ft. 6 in. Extreme height 4 ft. 4 in.

Price $100.00

Automatic Combination Sharpener.



Cut No. 84.

For Small Circular Rip and Band Re-saws.

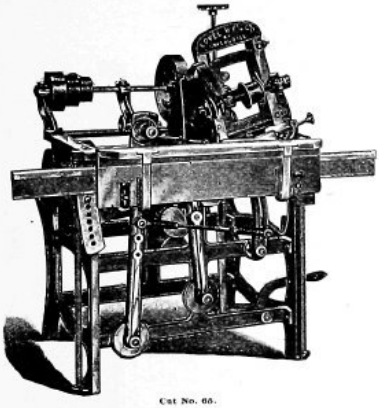
It will sharpen circular rip saws from 8 in. to 24 in.; band saws from 1 in. to 7 in. in width. It is easily changed from one to the other. Is furnished with Pulleys and Stands for carrying the band saw while being sharpened. Pulleys on countershaft are 5½ in. x 1½ in. belt. Speed about 650 revolutions per minute. Size of emery wheel used, 8 in. diameter, ⅝ in. hole, thickness to suit saw teeth.

Weight 400 lbs., floor space 2 ft. 8 in. x 2 ft. 5 in.; extreme height 2 ft. 10 in.

Price, combination $95 00

" for circular saws only 75 00

Automatic Gang Saw Sharpener.



Cut No. 66.

The above cut illustrates the latest machine for sharpening all kinds of gang saws with any shape or size of saw teeth. Size of Emery Wheel used 12 in. in diameter, 15/16 hole, thickness to suit saw teeth.

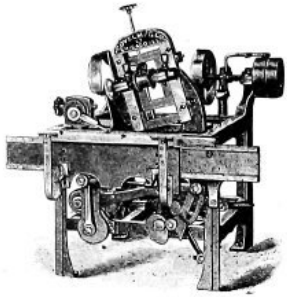
Pulleys on countershaft are 12 in. x 2½ in. belt.

Speed about 200 revolutions per minute.

Weight 880 lbs. Floor Space 4 ft. x 4 ft. Extreme height 4 ft. 10 in.

Price, ... $175.00

Automatic Gang Saw Sharpener.



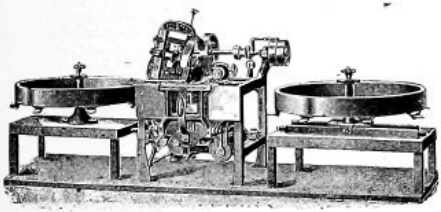
Cut No. 83.

This machine will sharpen pony gang saws 24 in. long between tabs, or less. In ordering always give length of saws between tabs. The head can be tilted to give the necessary hook in saws. The arbor can be set in such angle that a straight emery wheel will work the same as a concave. Size of emery wheel used 8 in. diameter, ⅝ hole, thickness to suit size of saw teeth. Pulleys on countershaft are 5½ in. x 1½ in. belt. Speed 950 revolutions per minute.

Weight 260. Floor space 2 ft. 7 in. x 2 ft. 7 in. Extreme height 2 feet 10 inches.

Price, ... $85.00

Automatic Band Re-Saw Sharpener.



Cut No. 66.

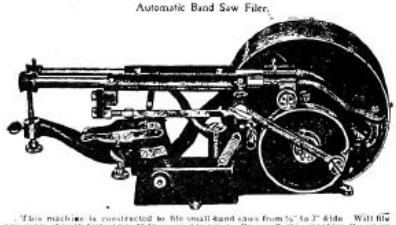
This cut shows a left hand machine. It is also made right hand, when so ordered. It will sharpen band saws from 1 in. to 7 in. in width and any shape or size of teeth wanted. It is furnished with or without, pulleys and stands as shown in cut. The wooden stands we do not furnish. Pulleys on countershaft are 5½x1½ in. face. Speed about 860 revolutions per minute. Size of emery wheel used 8 in. in diameter ⅝ hole thickness to suit size of saw teeth.

Weight complete 350 lbs. Floor space 22x27 in. Extreme height 54 in.

Price, machine only $75.00

Price, with Pulleys & stands $85.00

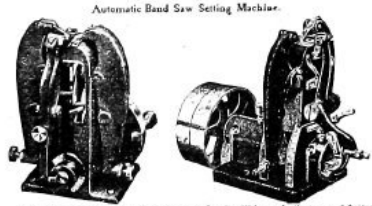
Automatic Band Saw Filer.



This machine is constructed to file small band saws from ⅜" to 3" wide. Will file any space of teeth from ⅛" to 1" from point to point. By use of this machine the saws are always kept to uniform width, and never need to be jointed. Each tooth will be the same, and, therefore, saws will do more and better work, and not so liable to break. A common 5" or 6" three-cornered file is used. Driving Pulleys are 10" to 14". Speed, 50 revolutions per minute. Weight, 80 lbs. Made in three sizes.

No. 57A for saws ⅜" to 1" wide. Price, ... $50.00.
No. 57B for saws ⅝" to 2" wide. Price, ... 55.00.
No. 57C for saws ⅞" to 3" wide. Price, ... 60.00.

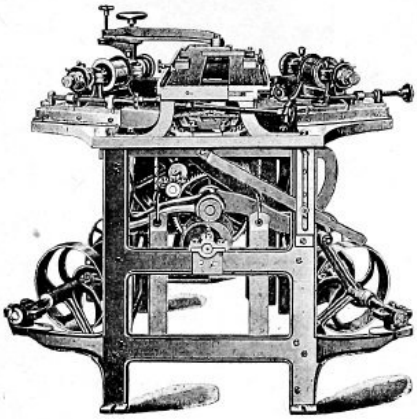
Automatic Band Saw Setting Machine.



When a band saw is set with this machine it will be perfectly true and distorse, which enables the saw to do more and better work. This machine will set 100 teeth per minute. Made in three sizes.

No. 59A for saws ½" to 1" wide. Price, ... $45.00.
No. 59B for saws ⅝" to 2" wide. Price, ... 50.00.
No. 59C. Power only. Price, ... 40.00.

Double Band Saw Sharpener.



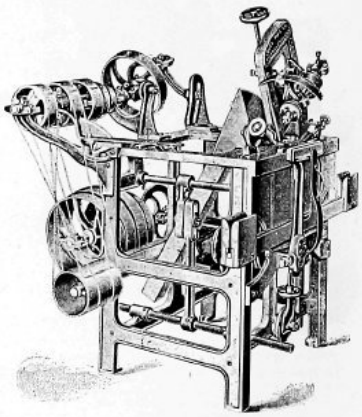
Cut No. 85.

The above cut illustrates a double band saw sharpener or a machine that will sharpen a double toothed band saw on both sides at the same time, 14 in. or less in width. It is provided with all possible adjustments to accommodate the different shape and size of band saw teeth. The emery wheel arbors are adjustable endways, which can be done while in operation. The arbors can be set in such angle that a straight faced wheel will work the same as a concave. These arbors are provided with extra long bearings. The slide or gate which carries the emery wheel is made extra long to give it plenty of wearing surface. The beads can be set in different angles according to the amount of hook in saw teeth. One side of the bed on which the saw rests is adjustable by means of two screws. One near each end of machine. The clamping device is held in place by one screw and is removed when a saw is put on or taken off. The two shafts which drive the emery wheel arbors has our patent knuckle joint, so that the driving Pulleys can be set at the same angle as the arbors. The cams and other working parts of the machine are in plain view and easy to get at in case any change is necessary. The machine is furnished with two 4 ft. wood pulleys and adjustable wall brackets that holds the pulleys, which is put up so that the saw is carried over the machine while being sharpened. Countershaft has tight and loose pulleys 4x14 in. Speed about 175 revolutions per minute. Size of emery wheel used 12 in. in diameter, 15-16 hole, thickness to suit size of saw teeth. Weight complete approximately 2560 lbs.

Price, ... $400.00

Automatic Band Saw Sharpener.

For Double Toothed Saws.



Cut No. 150

This machine is for sharpening double toothed saws 14 inches or less in width. It has a 4 ft. bar across the front, mounted with square steel bars tempered and ground true so the teeth are not injured from sliding over them. The bars can be turned over, thus giving them four wearing surfaces. The drivingshaft is made with two clutch pulleys, by which the motion of the emery wheel can be reversed. This is for the purpose of leaving the burr from the emery wheel on one side of the saw. It is also provided with a patent knuckle joint so that the driving pulley can be set

Post Bracket No. 3.

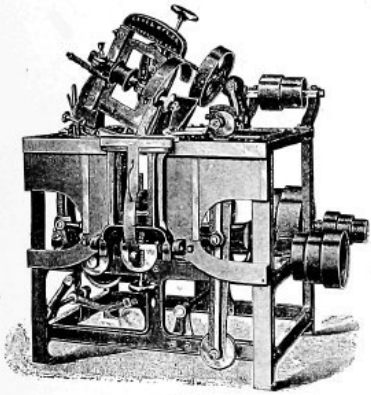
in line with the arbor pulley. The head can be set at any angle up to 45 degrees or less. The arbor bracket is adjustable on the slide and can be set so that a straight emery wheel can be used the same as a concave. The feed finger is provided with our patent detachable rest, which is made in such manner that it can be replaced by anybody when worn out as there are no holes, being held in position by means of other pieces. Cut shows a right hand machine. This machine is provided with two feed arms and 8 number 3 post brackets or floor stands. The post brackets are mounted with hardened steel bars ground on two sides, which can be reversed when worn. This stand is hinged so it can be opened on one side, making it an easy matter to put on, or take off the saw. These stands are also adjustable up and down by means of a hand wheel. If desired this machine can be furnished with pulleys and adjustable stands which are mounted on rollers so that they can be moved from one side to the other to accommodate both sides of the saw, in such case we do not furnish back feed, but there are six post brackets or floor stands which are placed three toward each end of the saw in such position that the pulleys will come in line with front of machine.

Pulleys on countershaft are 12x12½ inches, and should run about 200 revolutions per minute, which will sharpen 33 teeth. Size of emery wheel used 12 inches in diameter, 15-16 hole. Thickness to suit saws. Weight complete with back feed and post brackets, 1700 pounds. Weight complete with pulleys and stands, 2000 pounds. Floor space 46x30 inches. Extreme height 63 inches

Price, with Back Feed and Post Brackets, $250.00

Price, with pulleys and stands, $300.00

Automatic Band Saw Sharpener.



Cut No. 99

The above cut illustrates a left hand extra heavy and large machine for sharpening band saws from 8 in. to 15 in. in width, any shape of teeth from 1½ in. to 3 in. from point to point. The head can be set in any angle to 45 degrees. Emery wheel arbor can be set in such angle that a straight wheel will work the same as concave. Arbor is made so it will take emery wheels as thick as 1½ in. Feed finger is adjustable by means of an independent screw. Is provided with our patent detachable rest, which can easily be replaced when worn, as it has no holes and is held in place with other pieces to which there is no wear. Has an adjustable feed finger stop. Driving shaft has our patent knuckle joint which allows the driving pulley to be set in straight line with arbor pulley. It has three different speeds for feed mechanism, two different speeds for emery wheel. It is furnished with back feed, one No. 2 and four No. 1 post brackets. The No. 2 should be placed just below back feed finger. No. 1 Brackets should be placed to the best advantage for carrying the saw. If machine is to be used for both right and left hand saws we furnish two back feed arms, two No. 2 and six No. 1 post brackets.

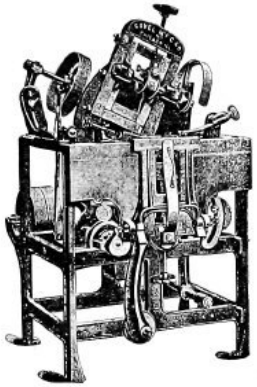
Post Bracket No. 1.

Post Bracket No. 2.

Pulleys on countershaft are 14 inches x 4 inch belt.
Speed about 185 revolutions per minute.
Size of emery wheel used 12 inches diameter, 15-16 hole.
Thickness to suit size of saw teeth.
Weight complete one hand machine, 1500 lbs.
Weight complete both hands 1700 lbs.
Floor space 4 feet 6 inches x 4 feet 8 inches. Height 5 feet 5 inches.

Price	one hand	$250.00
Price	both hands	$265.00

Automatic Band Saw Sharpener.



Cut No. 45.

The sharpener illustrated above is a left hand machine. It is also made right hand. When ordering always state whether right or left hand is wanted. It will sharpen saws 8 in. to 14 in. in width, all shapes and sizes of teeth from 1½ to 2 in. from point to point. The head can be set in any angle to 45 deg. Emery wheel arbor can be set in such angle that a straight wheel will work the same as a concave. Feed finger is provided with our patent detachable rest, which can easily be replaced when worn, as it has no holes. Is held in place with other pieces to which there is no wear. It has an adjustable feed finger. Driving shaft has our patent knuckle joint, which allows the driving pulley to be set in straight line with the arbor pulley, which saves belt. It has 3 step cone pulleys, which gives three different speeds to emery wheel. This machine is furnished with back feed, one No. 2 and four No. 1 post brackets, the No. 2 should be placed just below the back feed finger. The No. 1 Bracket should be placed to the best advantage for carrying the saw. If machine is to be used for both right and left we furnish two back feed arms, two No. 2 and six No. 1 post brackets. If furnished with pulleys and stands cut No. 12 page 37. Then, there is no back feed or post brackets.

Post Bracket No. 1.

Post Bracket No. 2

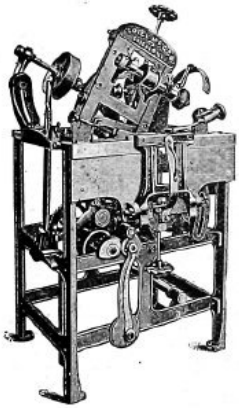
Pulleys on countershaft are 12 in. x 2½ in. belt.

Speed about 200 revolutions per minute, which will sharpen about 33 teeth. Size of emery wheel used 12 in. diameter, 15-16 hole, thickness to suit size of saw teeth.

Floor space 3 feet 10 in. x 2 ft. 9 in. Extreme height 5 ft. 4 inches

			Weight,
Price,		$200.00	1200
Price,	made for both right and left hand saws	$215.00	1400
Price,	without back feed and post brackets, and with pulleys and stands	$225.00	1225

Automatic Band Re-Saw Sharpener.



Cut No. 80.

Above cut illustrates a left hand machine. It is also made right hand. In ordering always state if right or left hand machine is wanted. Also if with back feed and post brackets, or with pulleys and stands. This machine will sharpen band saws from 4 in. to 8 in. width. All shapes and sizes of teeth from 1 in. to 2½ in. from point to point. The head can set in any angle to 45 degrees. Emery wheel arbor can be set in such angle that a straight wheel will work the same as a concave, has feed finger stop, and is provided with our patent knuckle joint in countershaft, so that driving pulley can be set in straight line with arbor pulley. It is furnished with back feed, one No. 2, and two No. 1 post brackets. The No. 2 should be placed just below the back feed finger. The No. 1 towards the long end of saw. If furnished with pulleys and stands there are no back feed or post brackets. Size of emery wheel used 10 in. diameter, 15-16 hole, thickness to suit size of saw teeth.

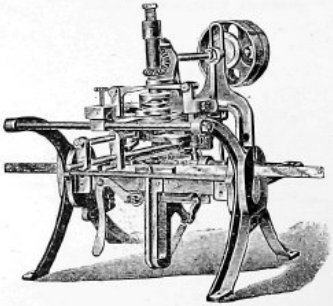
Post Bracket No. 1.

Post Bracket No. 2.

Pulleys on countershaft are 9 in. x 2½ in. belt.
Speed 800 revolutions per minute, which will sharpen about 28 teeth.
Weight with back feed and post brackets, 750 lbs.
Weight with pulleys and stands, 800 lbs.
Floor space 3 feet 6 inches x 3 feet. Extreme height 5 feet 2 inches.

Price, with back feed and post brackets $125.00
Price, without back feed and with pulleys and stands $150.00

The Cornish Automatic Saw Filer.



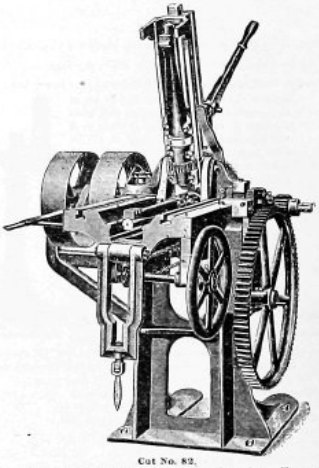
Cut No. 94.

The above cut illustrates a small automatic filing machine which will file hand and butcher saws from ¾ in. to 1¼ in. in width with teeth from 1-16 in. to ½ in. from point to point, either cross cut or rip saws, any shape of teeth. It is easily adjusted to file different sizes or shapes of teeth. Any ordinary 6 in. three corner file can be used. It can be operated by hand or power. Tight or loose pulleys are 5½ in. x 1¼ in. belt.

Speed about 150 revolutions per minute, which will file that number of teeth.

Weight 45 lbs. Floor space 2 feet x 1 foot 4 in. Height 1 foot 9 in.
Price, ... $35.00
Two pulleys for carrying band saw while being filed, price $5.00

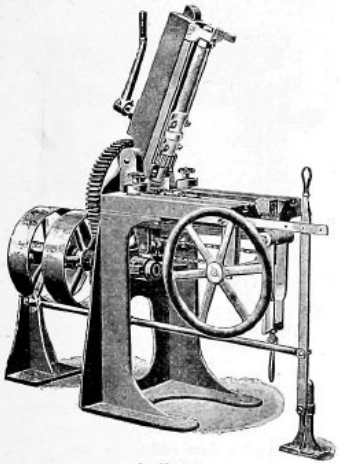
Weight, 35 lbs.



Cut No. 82.

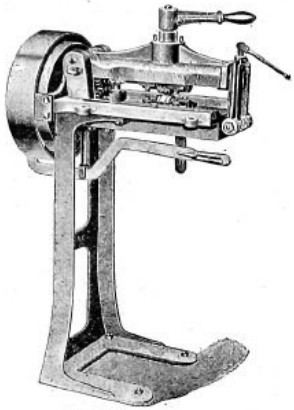
The above cut shows a Saw Roller or Stretcher. The rolls move across the saw. This machine is provided with shear attachment, also re-toother operated from the same pulleys on countershaft, which are 14x4 inches. Speed, 75 to 100 revolutions per minute, which will make the saw travel from 15 to 20 feet per minute. Weight, as shown, 850 lbs.; floor space 3 feet x 3 feet 6 inches. Extreme height 4 feet 9 inches.

Price, ... $275.00
Price, without re-toother $200.00



Cut No. 92.

The above cut shows a powerful and strong saw roller or stretcher with shearing attachment made especially for saw manufacturers. Can be used in saw mills where a heavy stretcher is wanted. Pulleys on countershaft are 16x5 inches. Speed about 100 revolutions per minute, which will make the saw travel 20 feet per minute. Weight of machine 950 pounds. Floor space 3 feet x 4 feet 6 in. Height 4 feet 9 inches.
Price, ... $200.00



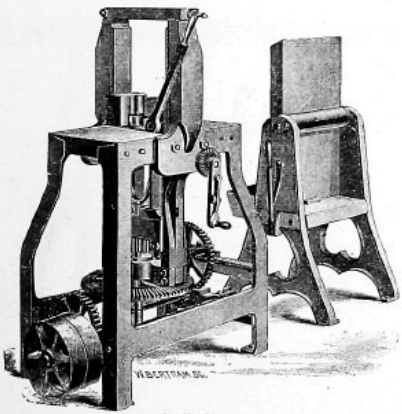
Cut No. 78

Band Re-Saw Stretcher.

As shown on above cut, it will be noticed that this stretcher is somewhat differently constructed from the ordinary method. It is operated by means of a large pulley, 15x4½ inches, which works in connection with inturned gears, making this machine very compact and durable. Also, rollers are geared together, which gives a uniform tension on the saws. It will tension saws to 8 inches in width. Speed of pulley from 75 to 100 revolutions per minute.

Weight 300 lbs. Floor space 1 ft. 4 in. x 2 ft. 5 in. Extreme height 3 feet 8 inches.

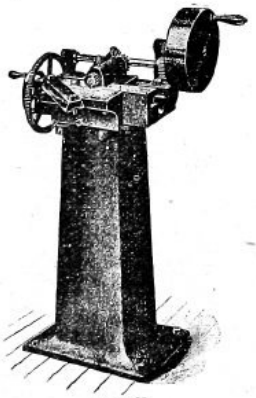
Weight without legs 230 lbs.
Price, ... $75.00
Price, with iron leg 85.00



Cut No. 10.

Machine for Stretching Band Saws.

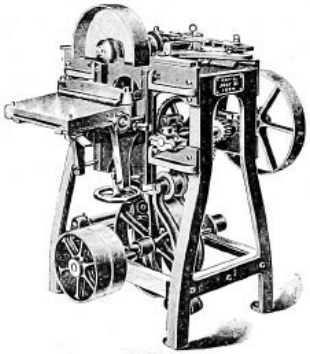
With this machine are a set of pulleys and stands, as shown in cut No 42 page 37 and one blocker, as shown in cut.
Pulleys on countershaft are 9 in. x 2½ in. Belt.
Speed about 350 revolutions per minute.
Weight, complete, 1,650 lbs.
Price, complete rig, ... $200.00



Cut No. 72.

This machine is made so it can be used either by hand or power. The cutter has an automatic feed across the saw, and stops automatically at the end of cut. It dresses the lap true and smooth. Two cutters are furnished with each machine. Price of extra cutters, $1.50

This machine is made in two sizes.
No. 72A for saws 14 in. wide or less. Driving pulley is 11 in. x 2 in belt. Speed, 200 revolutions per minute.
Weight 250 lbs. Floor space 25x18 in. 42 in. high.
No. 72 B for saws 7 in. wide or less. Driving pulley is 11 in x2 in belt. Speed 200 revolutions per minute.
Weight 225 lbs. Floor space 14x18 in.; 40 in. high.
No. 72A—Price, ... $90.00
No. 72B—Price, ... $75.00



Cut No. 15.

Automatic Emery Wheel Band Saw Scarfing Machine.

This machine is the strongest, most compact, and most accurate in its work of any scarfing machine or Lap Grinder made. It dresses with the utmost accuracy, leaving the two ends in such shape that, when put together, an almost invisible joint is formed, and no filing is required. The movement of the emery wheel is automatic, both lengthwise and sidewise, or by hand as desired, thus keeping both the face and roundness of the wheel perfectly true at all times, without dressing.

Pulleys on countershaft are 9 in. x 2½ in. Speed 400 revolutions per minute. Size of emery wheel used 12 in. x ⅞ in, 15-16 hole.

Weight 600 lbs. Floor space 2 feet 4 in. x 2 feet 10 in. Extreme height 3 feet 4 inches.

Price, for 12 in. saws $125.00
Price, for 14 in. saws 135.00

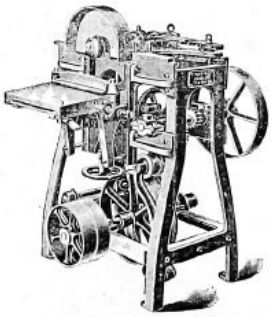
Cut No. 11.

Clamp for Band and Gang Saws.

We furnish with this clamp one face jointer and one side file,

Weight 300 lbs. Floor space 4 feet 7 in. x 1 ft. 7 in. Extreme height 3 ft. 1 in.

Price $50.00



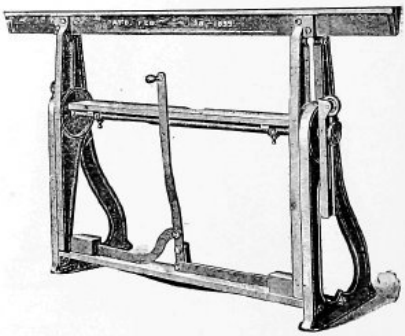
Cut No. 10.

Automatic Emery Wheel Scarfing Machine.

This machine is an exact duplicate of the large one. It will grind a lap true and perfect on band saws up to 8 in. in width. The frame which carries the emery wheel is now made the full length of the bed on which it travels, so it will keep out the emery dust and wear evenly. Pulleys on countershaft are 6 in. x 2 in. Speed, 220 revolutions per minute. Size of emery wheel used 10 inches x ¾ in. 15-16 hole.

Weight 400 lbs. Floor space 2 feet 9 in. x 1 ft. 9 in. Extreme height 6 feet 6 inches.

Price, ... $85.00



Cut No. 62.

Band Saw Clamp 6 Ft. Long.

The above cut shows a side opening clamp. The one jaw can be let down to one side at a right angle, which will allow the saw to enter from the side parallel with the support on which the saw rests, without lifting, which is a great convenience to the operator.

Weight 330 lbs. Floor space 9 feet x 1 ft. 6 in. Extreme height 3 ft.

Price, ... $65.00

Cut No. 31.

Clamps for Band Re-Saws.

Furnished with one side file as shown in Cut No. 37, page 64.

Length of jaws 40 inches.

Floor space 3 feet 9 inches x 1 foot 8 inches. Height 3 feet 6 inches.

		Weight.
Price, F. O. B., Chicago, with leg as shown in cut	$30.00	145
Price, F. O. B., Chicago, without leg	$20.00	65

Cut No. 12.

Pulleys and Stands for Band Saws.

The above cut shows one of the pulleys which is adjustable horizontally with screw. Both pulleys are adjustable up and down.

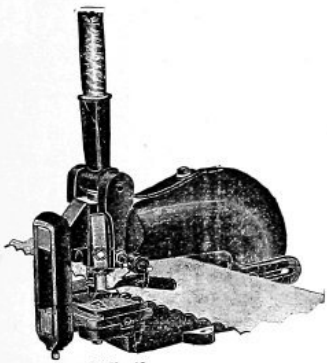
Weight 350 lbs. Floor space 4 feet 3 inches x 4 feet 3 inches.

Height 4 feet.

Price, ... $50.00

We make the same pulleys and stands extra heavy, weight 500 lbs:

Price, ... $75.00

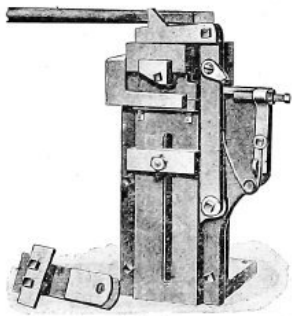


Cut No. 43.

The above cut shows a Combination Punch and Shear, for punching teeth in band or gang saws, or for trimming saws lengthways, and will cut across saws to 12 inches in width. The punch is provided with an adjustable pawl to gauge space of teeth. The die is made with open throat, so it can be sharpened on an ordinary emery wheel. In like manner the punch can be sharpened.

Floor space 2 feet x 11 inches. Height 21 inches.

		Weight.
Price, with one set of dies for 12 in. saws	$65.00	350
Price, with one set of dies for 14 in. saws	$75.00	450



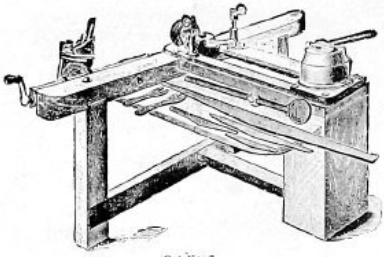
Cut No. 21.

The above cut illustrates an improved Retoothing Machine. The dies can be made for any shaped tooth. The machine spaces off the teeth and feeds the saw along as every tooth is cut. The saw rests upon a support which is adjustable. As the saw sits upright, its own weight keeps it down on the support. The saw is held firm, against the die by a set screw. It is easily operated, and one can re-tooth a saw in twenty minutes. We make a shearing attachment for this machine when so ordered.

Weight 150 lbs. Floor space 11"x12". Extreme height 21 in.

Price, ... $50.00

Price, with shear $75.00



Cut No. 8.

Improved Saw Bench.

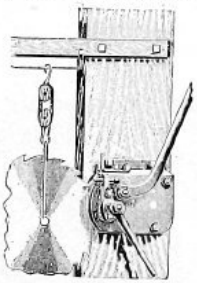
This is without doubt, from our knowledge of what is wanted in every mill, together with the many testimonials we have received from those using them, the best outfit for hammering and the general care of saws that has ever been introduced and accompanying each bench is our "Handy Guide" book, giving all necessary instructions how to remedy any and all defects in the saw. We have added improvements to it of late, making the bench a model acquisition to the file room.

Wood frame for bench we do not furnish, as that can be made in the mills the right height for saws used. See instructions for same in "Handy Guide."

Weight 240 lbs.

Price, ... $60.00

Price of "Handy Guide" book, separately $2.50



Cut No. 76.

Rhodes Upper Circular or Gang Saw Swage.

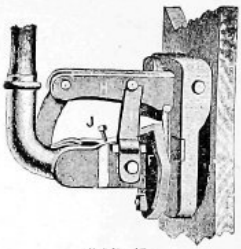
This swage is made from the best materials and workmanship, has abundant power and strength. Swages on top of tooth leaving face of tooth perfectly straight. Clamps catch tooth close to point, thereby prevent slipping or buckling. Will swage saws from 5 to 14 gauge.

When ordering always state whether for circular or gang saws.

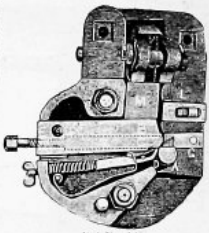
Weight, 100 lbs. Floor space 10x10 in. Height 20 in

Price for circular saw, ... $75.00

Price for Gang Saw, ... $75.00



Cut No. 13.
EXTERIOR VIEW.



Cut No. 14.
INTERIOR VIEW.

Kinney Improved Swage.

For Large Circular or Gang Saws.

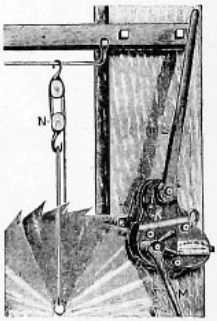
This Swage is the strongest and most powerful machine made for swaging saws. The interior view shows the improvements consisting of the adjustable Top Die with Holder, which is very desirable, as the Die can easily be removed in case it is necessary to regrind it.

Always state in orders if for circular or gang saws.

Weight 300 lbs. Floor space, 18x18 in. Extreme height, 2 feet

Price for circular saw, ... $75.00

Price for gang saw, ... $75.00



Cut No. 77.

"Rhodes" Under Circular Saw Swage.

The "Rhodes" under swage is perfectly made and of the best material, has plenty of power with direct pressure on face of tooth, back of tooth left perfectly straight. Clamps catch tooth close to the point. Large bearings on each side to prevent buckling or slipping. Will swage saws from 5 to 14 gauge. Adjustable to any style of tooth, makes a strong, lasting and rapid cutting saw tooth.

Weight, 100 lbs. Floor space, 10x12 in. Height, 22 inches.

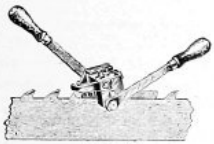
Price, ... $75.00

SAW SWAGES.

Cut No. 68

The Crescent Swage for Circular Saws.

Price, ... $35.00

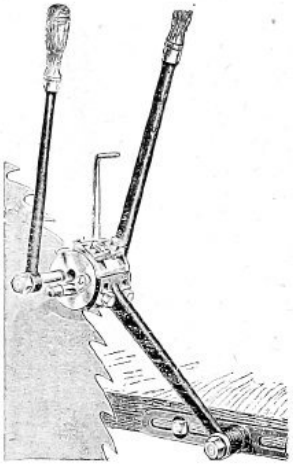


Cut No. 63.

The Crescent Swage for Band or Gang Saws.

Price, ... $35.00

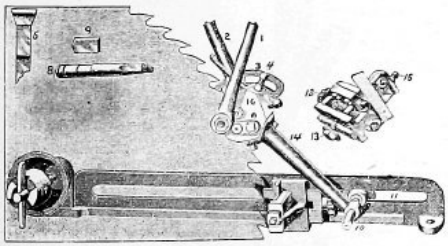
When ordering, please state thickness of saws; also send tracing of saw teeth.



The above cut illustrates the White Hand Swage for large circular saws from 4 to 10 gauge. This machine is provided with a bracket arm for fastening to the bench, as shown in cut.

Shipping weight, 26 lbs.

Price, ... $35.00



STYLE A4.

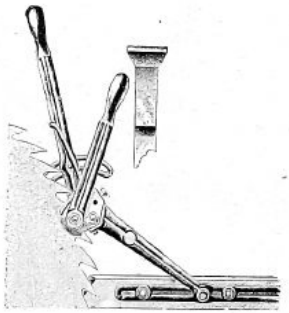
The above cut illustrates the Hanchett Hand Swage and Jointer complete for circular saws and is made in four sizes, as follows:

No. 1, for saws 5 to 11 gauge. Price $42.00

No. 2, for saws 11 to 16 gauge. Price $38.00

No. 3, for saws 16 to 19 gauge. Price $35.00

No 4, for saws 19 to 26 gauge. Price $35.00

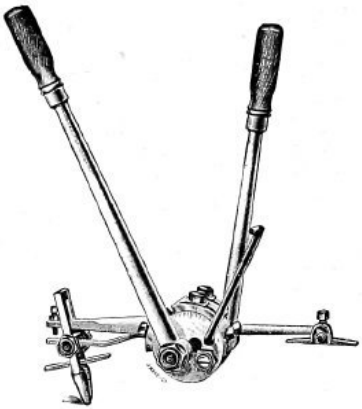


STYLE A5.

The above cut illustrates the Hanchett Hand Swage without jointer or bench casting and is designed for those who do not wish to pay for the jointer, but we advise a jointer with each Swage as it is also a convenient device on which to do fitting and side dressing, and on which to operate the Swage. This style is made in one size only for saws from 5 to 11 gauge.

Price, ... $35.00

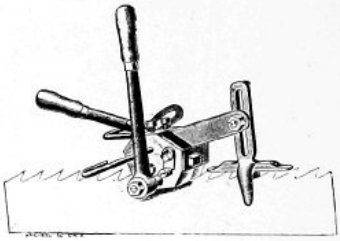
SAW SWAGES.



The above cut illustrates the White Hand Swage for thin circular saws. It is provided with brackets which can be adjusted to fit the pitch of the saw and will swage saws of 10 gauge or thinner.

Shipping weight, 14 lbs.

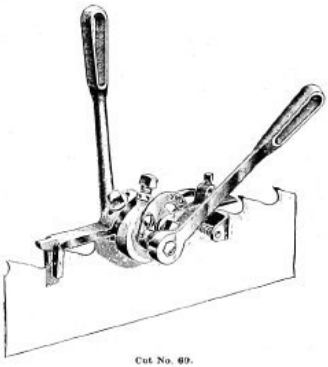
Price, ... $35.00



STYLE A3.

The above cut illustrates the Hanchett Hand Swage for Band or Gang Saws. When ordered for use on gang saws, a fork is furnished that has no forward projection, thus making it more convenient for swaging the last teeth at lower end of saw. For band saws, it is furnished as shown in cut. It is made in three sizes.

No. 1, for saws 11 to 16 gauge. Price, ... $33.00
No. 2, for saws 16 to 20 gauge. Price 28.00
No. 3, for saws 19 to 24 gauge. Price 28.00



Cut No. 60.

The Crowell Swage.

The best constructed and most easily adjusted swage for band, gang and circular saws.

The different sizes are as follows:

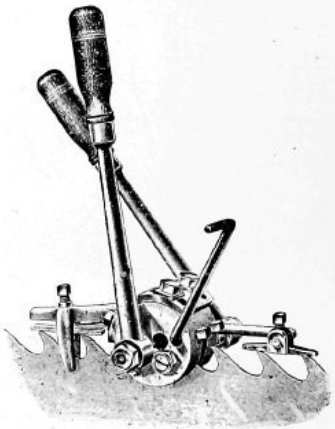
No. 1 is suitable for all saws from 16 to 22 gauge, and will fit teeth one inch or further apart.
Price, ... $20.00

No. 2 is suitable for all saws from 12 to 16 gauge, and will fit teeth one and a quarter inches or further apart.
Price, ... $25.00

No. 3 is suitable for all saws from 9 to 12 gauge, and will fit teeth one and one quarter inches, or further apart.
Price, ... $25.00

No. 4 is suitable for all saws from 6 to 12 gauge.
Price, ... $30.00

The CROWELL SWAGES will work on Band or Gang Saws, and also on Circular Saws of the same thickness without the least adjustment.



The above cut illustrates the White Standard Swage for Band Saws from 12 to 16 gauge. Any shape of hand saw teeth in use can be swaged with this swage by properly adjusting the die and anvil.

Shipping weight, 13 lbs.

Price, ... $35.00,

The Turner Brazing Outfit for Brazing Band Saws.

Brazing made easy.
Joints permanent.
Anybody can do it.
Costs only a few cents.

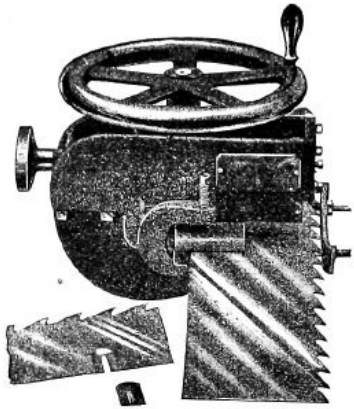
Outfit consist of
One Holder for clamping saws while being brazed.
One Turner Brazing Torch.
One pound Turner Brazing Mixture.

The Turner Brazing Outfit is the best apparatus for the purpose yet introduced. Other methods are crude and objectionable as well as high priced and hard to operate successfully. Tongs are old fashioned and clumsy, and are only used for lack of something better. Silver solder heretofore used for brazing band saws costs about 90c per ounce, making that kind of brazing very expensive as well as difficult. There are some other devices but they offer little improvement, and the result is thousands of good band saws are simply thrown away rather than try to mend them.

Repairing broken band saws is a very simple operation, quickly and inexpensively done when the Turner Outfit is used. The Holder for clamping saws may be placed in a vise or screwed to a bench, whichever is most convenient. The Turner Brazing torch is exactly suited for brazing band saws, as the flame is a small concentrated pointed flame of intense heat which makes the braze in a few seconds. The two valve device permits intelligent control of the fire.

The Turner Brazing Mixture is specially prepared for band saw work and will be found of superior quality. The directions sent with each outfit, are full and complete. Saws up to 1½ or 2 inches are easily and quickly brazed in a permanent manner at almost no expense, and a boy can do the work by using this outfit.

Price, packed one complete outfit in box... $10.00 net



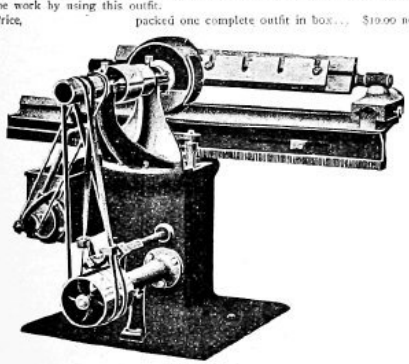
Cut No. 44.

Band Saw Patch Machine.

As the name implies, this machine is designed to make the patching of cracks in band saws; an easy and successful process. With the use of this machine, the surface of the saw along the edges of the crack is quickly milled and, the patch being furnished with machine in gauges to suit the saw, the process is easily performed. This machine is furnished with 2 cutters and 4 pieces of prepared patch.

Weight 75 lbs.

Price, ... $30.00
Price of extra patch, 3 in. long or less any gauge, each $0.25

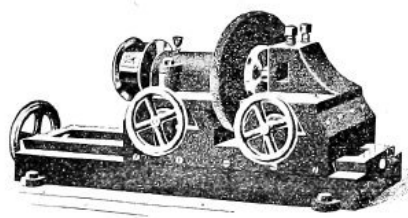


Cut No. 87.

Automatic Cup Wheel Knife Grinder.

Adapted to either flat or concave grinding. By slacking one bolt the slide can be set at different angles before the wheel. If set at a right angle to emery wheel spindle, the knife will traverse back and forth against the flat face and the knife be ground to a flat bevel. If it is set at any other angle the edge of wheel will do the grinding and a concave grind result. These adjustments will be appreciated by any one preferring a flat, stout edge for rough work and a thin concave for fine work. After the machine is started it requires little or no attention. The cup wheel is 8x3½ in., and is provided with guard. The tight and loose pulleys are 4½ inches diameter by 3½ inches face and should be run about 1200 revolutions per minute.

No. 87A 26-in. Grinder, Price $75.00
Weight 650 lbs.
No. 87B 32-in. Grinder, Price, ... $85.00
Weight, 725 lbs.
No. 87C 38-in. Grinder, Price, ... $95.00
Weight, 825 lbs.



Cut No. 91.

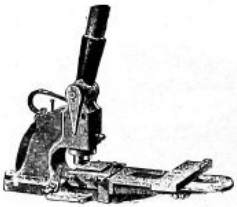
Band Wheel Grinding Machine.

This machine is thoroughly built and has a heavy compact iron frame. In addition to the emery wheel, the machine is supplied with a tool for taking a cut from the face of band wheel, or turning pulleys, shafts and frictions, making this a very useful machine to have in a saw mill.

Weight of machine complete, 350 lbs. Floor space 12x36 inches.

Height, 18 inches.

Price, with one emery wheel and tool $90.00



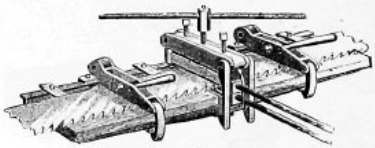
Cut No. 39

Re-Toother and Shear.

This machine is made for re-toothing band or gang saws 16 gauge or lighter. The guide is adjustable to suit the width of saw, and may be set to punch teeth with any hook. The spacer is also adjustable to any length of teeth. If desired we can furnish a shear attachment for shearing a saw lengthways. When ordering always send template of saw teeth.

Weight about 125 lbs.

Price, ... $35.00
Price, with shear $45.00



Cut No. 10.

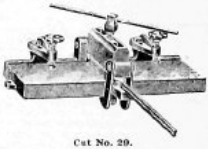
Brazing Table.

The above illustrates the Table as we now make it. The clamping is done with steel screws, and is the strongest clamp made. The top of the table is wood to protect the swaging, and is made wide enough for 12 in. saws; it is also provided with gauges for narrow saws.

We can make this table for 14 in. saws if so ordered.

Weight, 300 lbs. Floor space 45x20. 12 in. high.

Price, ... $50.00



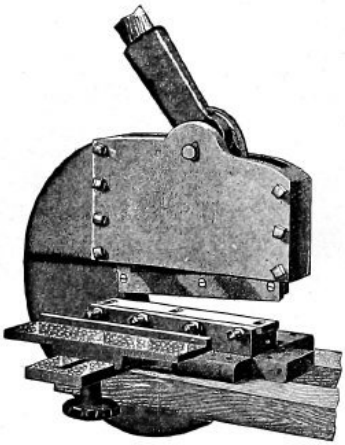
Cut No. 29.

Brazing Table.

For Band Re-Saws from 2 in. to 8 in. in width.

Weight 100 lbs. Floor space 28x12. 10 in. high.

Price, ... $20.00



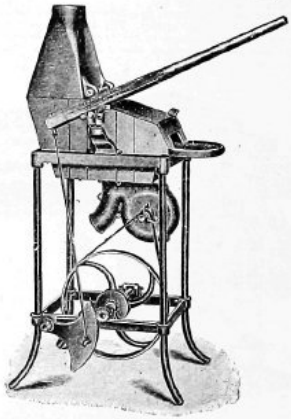
Cut No. 72.

Shear for Trimming Band or Gang Saws.

The Guide as shown in cut is in position for shearing lengthwise, and it can be shifted in front of the machine very quickly to use for cross cutting. It will cut 14 inches clear cut in one stroke. We fully guarantee this shear.

Weight about 350 lbs. Floor space 16x24 in., 24 in. high.

Price, ... $80.00



Forge for Heating Brazing Irons.

This Forge will heat the Brazing Irons uniform up to 14 inches long It has a closed cast iron hood which makes it safer from fires than an ordinary Blacksmith Forge. A common stove pipe can be used to conduct the smoke outside. Coal, bark or wood can be used to heat the irons.

No Band Saw Mill should be without this forge.

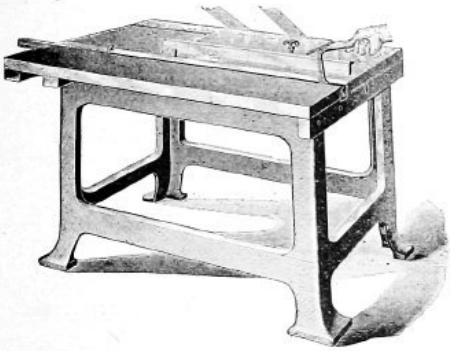
Weight, 265 lbs. Floor space 2 feet 9 x 1 foot 10 in.

Extreme height 4 feet 5 inches.

Price, complete ..... $30.00.
Price, hood only $15.00

Brown's Edging Device.

Cut below shows the device put in place on saw table and how the wood is held while being straightened.



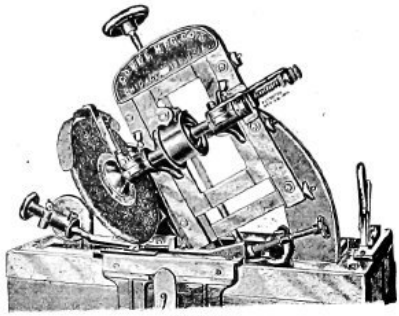
DESCRIPTION.

This straight edge attachment for rip saws is an invention that does away with what we call free-hand sawing, and is a saver of lumber and time. For this reason, it will not require more than one cut at any time, and that cut can be so slight that the saw will just skim the edge of the board and still be straight, whereas a free-hand Sawyer will require at least a ¼ of an inch and more to steady his saw in the cut and very often taking one or two and three cuts and more to get his piece nearly straight. It will, therefore, be seen that it saves lumber and time. In this way also it is usual in matching lumber for glueing together to allow a full ¼ of an inch for each joint and very often if the piece to be jointed together is from 3 to 6 feet long, it will require two cuts on the jointer for each piece, making four cuts for one joint and if the piece is say 18 in. or more in width, as it often is, and contains four joints, it will be seen that one inch has been lost in shavings by the jointer and the jointer hand has lost time in making two cuts instead of one. With this attachment you have saved ½ inch of lumber on the same piece as it will not require more than a full ⅛ inch for each joint and furthermore it requires no special skill to work it. You can take any ordinary sawyer who is not a free-hand sawyer and he will, after a little practice, do as much work as any free-hand sawyer, and not have any open joints. Sent on trial if desired to any responsible party.

Price, ... $25.00

NOTE.—When ordering, give length of saw table, lumber to be straightened and correct measure from front end of saw table to center of saw arbor. Also correct distance to center of cleat, measuring from front end of table in this way, to center of arbor, say, 24 in. 1st cleat 3 in., 2nd cleat 16 in., 3rd cleat 32 in., 4th cleat 48 in.

Full instructions how to place and adjust will be sent with each edging.



Cut No. 99.

Huff's Automatic Adjusting Attachment.

For Band, Gang and Circular Saw Sharpeners.

The above cut shows attachment in place on an automatic band saw sharpener. By proper use it will prevent burning or case-hardening of saw teeth. It can be adjusted while the sharpener is in operation, so that emery wheel will grind hard or light as desired. By using this attachment a saw can be pointed up finer and more accurate than can be done by a file. It is made in two sizes. The large size is for sharpeners where 10 or 12 inch emery wheels are used. The small size for sharpeners where 8 inch or smaller emery wheels are used.

Price, large size $15.00
Price, small size $12.00

NOTE.—All orders should be accompanied by the makers name of sharpener, the distance between center of cap bolts on box in which arbor runs. Also diameter of arbor where collar is fastened. Full instructions for applying and adjusting will be sent with each attachment.

LIST OF MACHINES TO MAKE COMPLETE OUTFIT FOR BAND SAW FILING ROOM.

1 or 2 Automatic Sharpeners.
1 Saw Stretcher.
1 Scarfing Machine.
1 Fitting-up Clamp.
1 Set of Pulleys and Stands.
1 Brazing Clamp.
1 Re-toother and Shear.
1 Heavy Shear—for Cross Cutting.
1 Forge for Heating Brazing Irons.
1 Patch Machine.
1 Anvil—10x12, 10x14 or 12x16—
1 Straight Edge—5 or 6 ft. long.
2 Hammers.—1 Cross Pean—1 Ball and Pean.
1 Hand Swage.
1 Swage Sharper.
1 Leveling block—

PLANS OF A FILING ROOM SENT ON APPLICATION.

OUTFIT FOR BAND RE SAW FILING ROOM.

1 Automatic Sharpener.
1 Saw Stretcher.
1 Scarfing Machine.
1 Fitting-up Clamp.
1 Brazing Table.
1 Anvil—5x8, 6x8 or 6x10.
1 Straight Edge—3 ft. long.
2 2-lb. Hammers.—1 Cross Pean—1 Ball Pean.
1 Hand Swage.

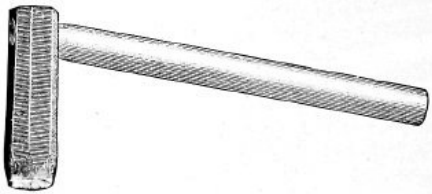
SAW MAKERS' TOOLS.

ANVILS, STEEL FACED.

50 to 250 pounds.....price, per pound, 12c.

We keep in stock Anvils 10 x 6 face, 86, 110, 145 pounds; 12 x 6, 250 pounds.

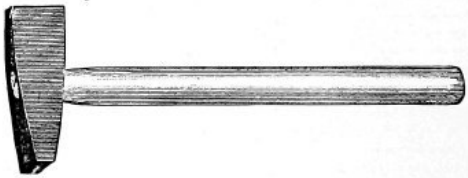
ROUND FACE HAMMER.



Price, per pound.....40c.

Furnished any weight desired.

SQUARE FACE HAMMER.



Price, per pound.....40c.

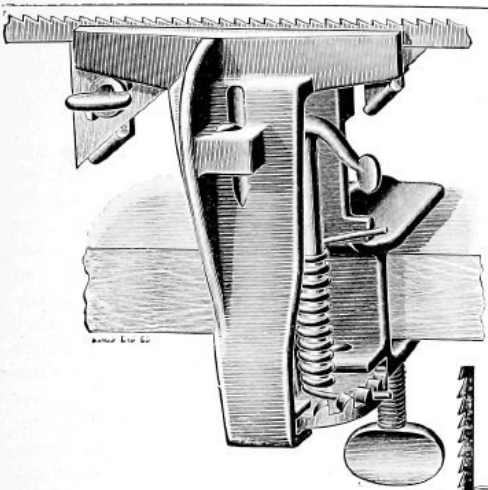
Furnished any weight desired.

STRAIGHT EDGE.

Inches.....	4	6	8	10	12	18	24	30	36	40
Price, each	$0 40	$0 45	$0 50	$0 55	$0 65	$0 95	$1 36	$1 65	$1 95	$2 10
Inches.....	44	48	52	54	56	60	72	84	96	
Price, each	$2 30	$3 00	$3 50	$3 70	$4 00	$4 60	$5 50	$6 50	$7 50	

LEVELING TABLE.

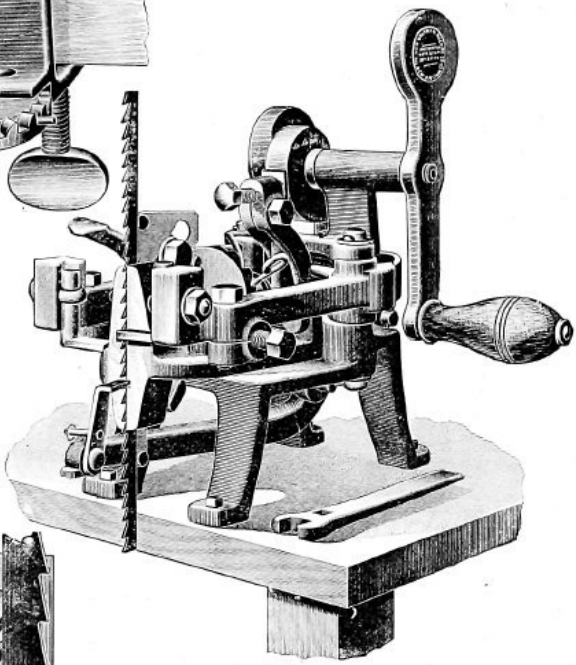
12 inches wide, 7 feet long.....Price, $12 00



SELF-ACTING VISE.

For Filing Band Saws.

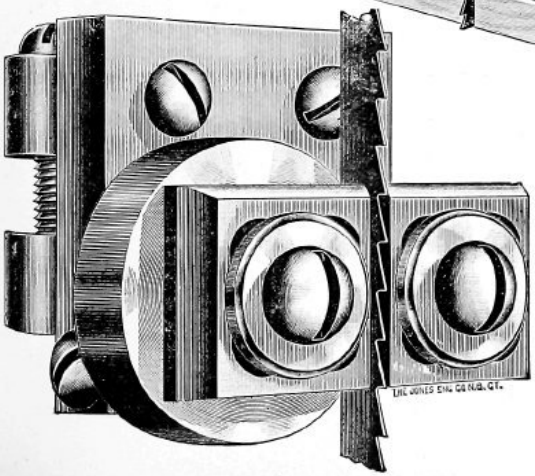
Better work in half the time, with half the labor and only one adjustment.
Price $6 00



EQUAL BLOW SETTING MACHINE.

For Band Saw Blades.

Sets saw in five minutes on machine or at bench. Only machine setting two teeth at once.
Price.....$15 00

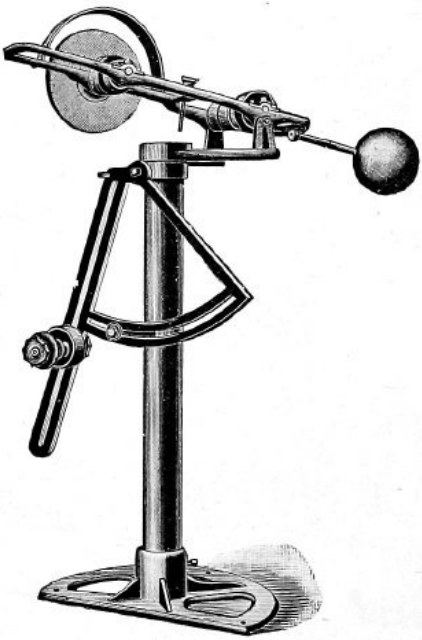


PINEO BAND SAW GUIDE.

Smallest Guide Made.

Casts no shadow; has ball bearings; reversible disk gives double life; back and side supports for saw at same point; cheapest, because longest lived; adjustable to any saw.
Price.....$10 00

THE HOO-HOO SAW GUMMER AND SHARPENER.



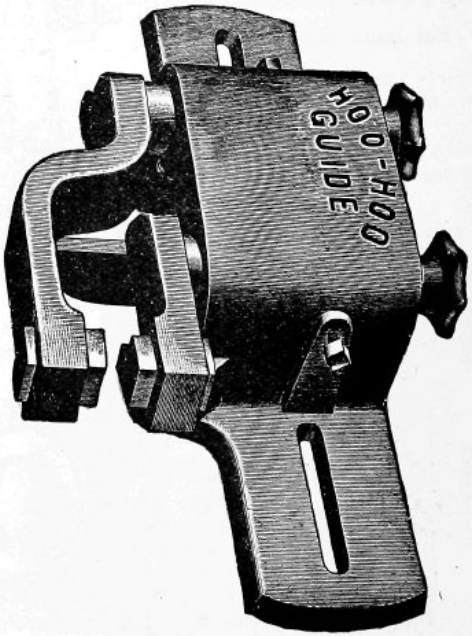
This machine is made from new and improved patterns, combining all the latest and best improvements. Weight about 375 lbs. It has refined steel shafts, with large collar, long and adjustable bearing; has adjustable stop to regulate the depth and shape of tooth. It is easily adjusted to any size saw up to 74, for rip or cross cut, square or cut under to any degree, and any shaped tooth, or distance between the teeth; has two changes of speed, is compact, and occupies but a small space on the floor. The dimensions of tight and loose pulley on the driving shaft, 4 inches diameter, 2½ inch face; speed about 1,000 revolutions per minute.

Price.....$35 00

THE HOO-HOO SAW GUIDE.

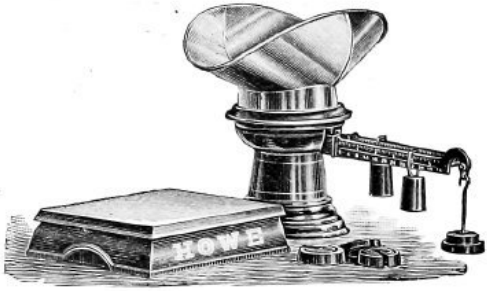
The adjustments are made by turning the hand wheels, by which either jaw can be moved independent of the other. The jaws are turned so as to make a neat fit in the bearings and move parallel to the surface of the saw. The jaws can be turned back to permit the removal of the saw without displacing the guide.

Price.....$12 00



UNION OR FAMILY SCALES.

With Single or Double Beam and Patent Frame.

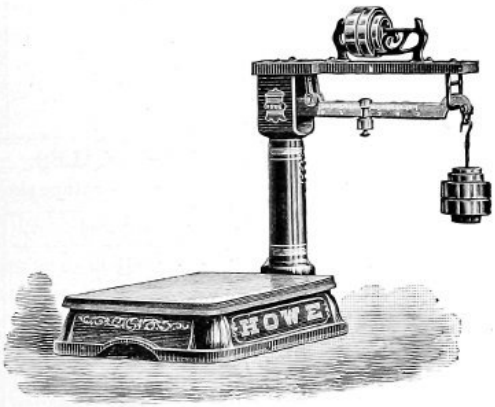


Capacity, ½ oz. to 240 lbs.; platform, 10x14 inches.

Beams graduated as follows: Front bar, upper row of figures, for Round Platform, ½ oz. to 5¼ lbs.; lower row of figures, for Square Platform, 4 oz. to 44 lbs.
Rear or tare bar, for Round Platform, ½ oz. to 5 lbs. Balance of capacity made up by weights.

No.		Price.
	WITH DOUBLE BEAM.	
322.	With tin scoop	$15 00
326.	" brass "	16 00
807.	" tin funnel scoop	16 00
808.	" brass " "	17 50
	WITH SINGLE BEAM.	
320.	With tin scoop	$14 00
324.	" brass "	15 00
805.	" tin funnel scoop	15 00
806.	" brass " "	16 50

COUNTER SCALE.



No. 345; capacity, 200 lbs. x 1 oz.; platform, 10x14 in.; price, $16.00.

Catalogue showing full line of Counter Scales will be sent upon receipt of request.

PORTABLE PLATFORM SCALES.

Highest Quality Made.

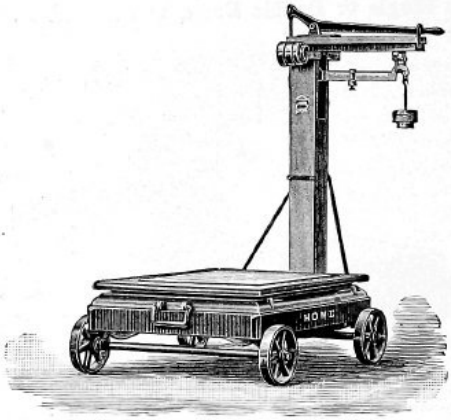


Illustration of Drop Lever Scale.

Raising and Lowering Levers are Independent of the Weighing Levers. All Knife Edges have Protection by Howe "Ball Bearings."

These Scales have a Patent Drop Lever, which raises the platform entirely off from the working parts of the Scale while it is being loaded. This is done without moving the beam or any of the working parts of the Scale.

New No.	Old No.	Capacity.	Size of Platform.	List Price.
76	1	4,000x½ lbs.	32x40 in.	$140 00
78	2	3,500x½ "	32x40 "	130 00
79	4	2,500x½ "	26x34 "	94 00
82	5	2,000x½ "	23x32 "	82 00
84	6	1,500x½ "	21x30 "	69 00
86	7	1,200x½ "	19x28 "	56 00
88	8	1,000x½ "	17x26 "	50 00
85	8½	800x¼ "	17x24 "	45 00
87	9	600x¼ "	16x24 "	40 00
89	10	400x¼ "	15x22 "	34 00

PLAIN PORTABLE PLATFORM SCALES.

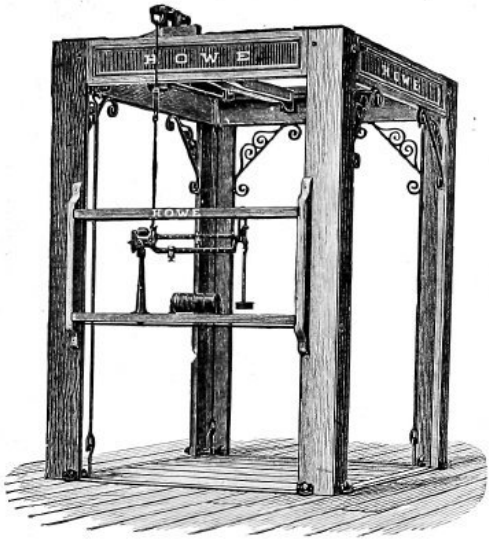
Same as illustrated, but without Drop Lever Feature shown.

New No.	Old No.	Capacity.	Platform.	Price.
18	4	2,500x½ lbs.	26x34 in.	$85 00
22	5	2,000x½ "	23x32 "	75 00
24	6	1,500x½ "	21x30 "	56 00
26	7	1,200x½ "	19x28 "	48 00
28	8	1,000x½ "	17x26 "	43 00
29	8½	800x¼ "	17x24 "	38 00
30	9	600x¼ "	16x24 "	33 00
32	10	400x¼ "	15x22 "	26 00

All Portable Scales of 400, 600 and 800 lbs. capacity have beams graduated by ¼ lbs. to 50 lbs., and all of larger capacity have beams graduated by ½ lbs. to 100 lbs.

SUSPENSION SCALES.

With Frame and Platform Complete.



This Scale can be set in floor, as above, or used as a Portable Scale, and easily moved from place to place.

Total height of posts, 8 feet 8 inches; above platform, 8 feet.

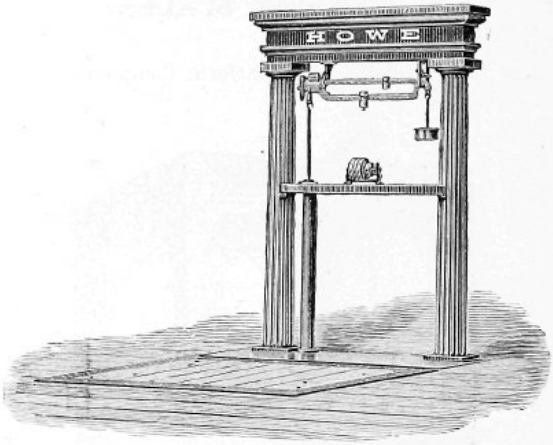
Size of platform ..... 5x6 feet
" " " between rods ..... 4 ft. 6 in. by 5 ft. 3 in.
Capacity ..... ½ to 4,200 lbs.

The regular Scale is furnished with Double Brass Beam, as shown in cut. Upper bar graduated ½ to 100 lbs.; lower bar, 1 to 200 lbs.

		Price.
No. 590.	Graduated iron weights and counterpoise	$158 00
No. 770.	" zinc " " iron counterpoise	162 00
No. 772.	" " " " brass "	165 00
No. 774.	" brass " " " "	186 00

If wanted with single beam deduct $8.00 from above prices.
The single beam is graduated by ½ to 120 lbs.
Note the size of platform of this Scale.
All levers are above the platform and beyond the effects of moisture, salt, etc.

DORMANT WAREHOUSE SCALES.



With two iron pillars, double brass beam, upper bar graduated by ½ lbs. to 100 lbs.; lower bar 1 lb. to 200 lbs., and graduated counterpoise and weights.

New No.	Capacity.	Platform.	Platform to Pillar.	Extreme Size of Floor Opening.	Price.
215	6,000x½ lbs.	48x54 in.	16⅛ in.	78 x48¼ in.	$185 00
164	5,000x½ "	48x48 "	16⅛ "	72 x48¼ "	170 00
169	4,000x½ "	48x48 "	16⅛ "	72 x48¼ "	155 00
166	3,500x½ "	43x45 "	17⅜ "	70 x44 "	125 00
183	3,500x½ " With extra	43x45 " long neck	23⅜ "	76¼x44½ "	133 00
168	2,500x½ lbs.	36x38 in.	15¼ "	61¼x44 "	105 00
538	1,500x½ "	44x34 "	15 "	56¼x44¾ "	100 00
540	1,200x½ "	43x33 "	15½ "	56¼x44¼ "	96 00

CALIFORNIA GRAIN DORMANT.

167	2,500x½ lbs.	38x46 in.	15¼ in.	69¼x44 in.	113 00

CLOTH DORMANT.

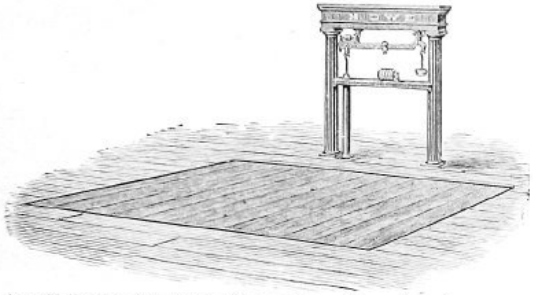
208	2,500x½ lbs.	46x38 in.	15¼ in.	61x47 in.	113 00

Brass counterpoises and weights, or Scales with compound beams requiring no weights, furnished to order. Can also furnish with short pillar beam fixtures at corresponding reduction in price.

These Scales are Furnished Complete as Shown. All Knife Edges Protected by Howe "Ball Bearings."

RAILROAD DEPOT SCALES.

With Pillars and Cap.

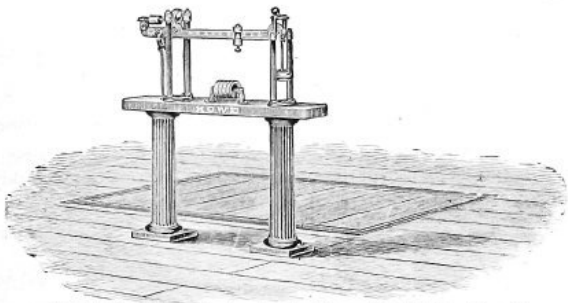


Beams graduated by 2½ lbs. to 500 lbs. for 4 tons capacity and under, over 4 tons to 1,000 lbs.

No.	Capacity.	Size of Platform.	Edge of Platform to Beam Rod.	Price.
216	6 tons	10 ft. x 9 ft.	1 ft. 10 in.	$280 00
217	6 "	6 " x 4 "	3 " 0 "	250 00
220	4 "	9 " x 7 "	2 " 10 "	230 00
222	3 "	8 " x 6 "	2 " 0 "	215 00
224	3 "	6 " x 5 "	2 " 6 "	200 00
226	2 "	6 " x 5 "	2 " 6 "	175 00

These Scales Require Foundation. Plans Furnished Free.

DEPOT AND WAREHOUSE SCALES.



All Knife Edges Protected by Howe "Ball Bearings."

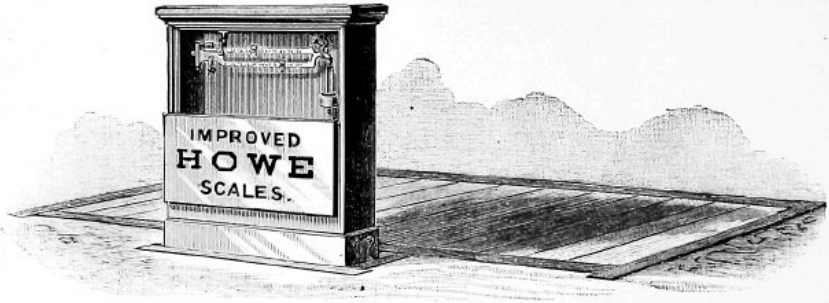
With Short Iron Pillars, Shelf and Beam Hangers.

No.	Capacity.	Size of Platform.	Edge of Platform to Beam Rod.	Price.
678	6 tons	10 ft. x 9 ft.	1 ft. 10 in.	$240 00
680	6 "	6 " x 4 "	3 " 0 "	210 00
682	4 "	9 " x 7 "	2 " 10 "	200 00
684	3 "	8 " x 6 "	2 " 0 "	185 00
686	3 "	6 " x 5 "	2 " 6 "	170 00
688	2 "	6 " x 5 "	2 " 6 "	145 00

Double Beam for Scales 5 tons and under, extra.....$ 8 00
" " " " 6 " " over, " 10 00

Above prices are exclusive of timber and foundation. Depot scales of other sizes or different proportions will be furnished at corresponding prices.

HAY, COAL, STOCK AND WAGON SCALES.



In addition to the sizes and capacities shown, we make Special Scales adapted to all locations. Extensions to carry Beam additional distance from platform, for 2 feet, $12.00; for each additional foot, $2.00 list.

With Improved Double Brass Beam.

Graduated by 2½ lb. marks.

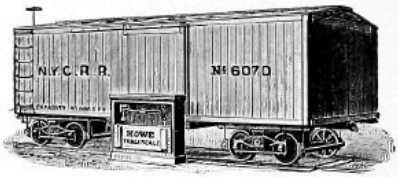
No.	Capacity.	Size of Platform.	Edge of Platform to Beam Rod.	Price.
244	20 tons	22x8 ft.	2 ft. 4 in.	$450 00
246	15 "	22x8 "	2 " 4 "	400 00
248	10 "	22x8 "	2 " 4 "	330 00
251	10 "	16x8 "	2 " 4 "	315 00
253	10 "	14x8 "	2 " 4 "	300 00
254	8 "	22x8 "	2 " 4 "	300 00
257	8 "	16x8 "	2 " 4 "	285 00
259	8 "	14x8 "	2 " 4 "	270 00
260	6 "	22x8 "	2 " 4 "	265 00
263	6 "	16x8 "	2 " 4 "	250 00
265	6 "	14x8 "	2 " 4 "	225 00
267	5 "	14x8 "	2 " 0 "	200 00
268	4 "	14x8 "	2 " 0 "	165 00
270	3 "	14x8 "	2 " 0 "	145 00

These Scales require a total depth of only 20 to 28 inches. The cost of preparing a foundation for any of the above Scales is less than that for other Scales generally in use.

Timber, work and foundation for any of the above Scales to be furnished by the purchaser.

Compound or Weightless Full Capacity Beams in all the latest improved kinds can be furnished with these Scales at additional cost.

RAILROAD TRACK SCALES.



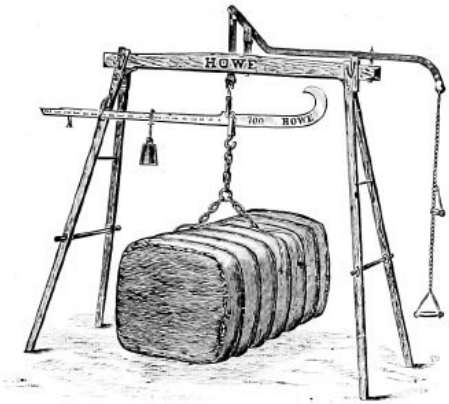
The latest Extra Heavy Iron Frame Howe Track Scale contains every improvement known to modern science in the manufacture of heavy weighing machines.

Made in all lengths of platform from 12 to 150 feet and from 30 to 150 tons weighing capacity, and for all purposes for which such Scales are required.

Send in specifications for prices, give length of platform and capacity required.

Plans furnished free.

SOUTHERN COTTON BEAM AND FRAME.



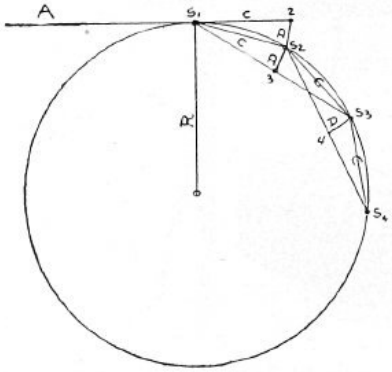
Capacity, 1 lb. to 700 lbs.
" 1 " " 800 "

700 lbs., japanned iron beam and frame, complete		$50 00
700 " polished steel " " " "		60 00
800 " japanned iron " " " "		60 00
800 " polished steel " " " "		70 00
700 " japanned iron " " poises only		22 00
700 " polished steel " " " "		32 00
800 " japanned iron " " " "		27 00
800 " polished steel " " " "		37 00
Frame only for 700 lbs		28 00
" " " 800 "		32 00
Cotton hooks, set		3 00
Shipping weight, 700 lb. outfit, complete		250 lbs.

Laying Out Curves

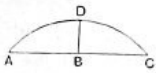
It is hardly within the limits of a condensed catalogue of locomotives to cover fully a subject so technical as the laying out of railroad curves. In cases where the services of a professional surveyor cannot be obtained it is possible to lay out curves without surveyor's instruments.

In the diagram the straight track is represented by the line A—S1. The point where the curve is to begin is noted as Station One (S1). Continue the straight line beyond S1, as shown by line C (*i. e.*, from S1 to 2), a distance of 100, 50 or 25 feet, according to how sharp a curve is to be laid out or whether the situation is cramped or not, as shown by the table below. Start from Station S1 with a line or chain of length C, as given by the table. From the end of this line C measure the offset D, of length as given in the table, to Station Two (S2), so that its distance from Station S1 is also measured by the line C. Then measure from S2 the same offset D to point 3, making distance from point 3 to S1 also the same as line C. A line drawn from S1 to point 3 and continued in the same direction an additional distance C fixes the next point, Station Three (S3). Making from S3 another offset D, so that the distance S2 to S3 and S2 to 4 are each the length of line C, and prolonging the line S2 — 4 in a straight line an additional distance C, fixes Station Four (S4). Thus the points on the curve have been fixed S1, S2, S3 and S4. The same process is continued until a point is reached where it is desired to discontinue the curve and lay straight track.



In cramped locations the length of the line C (which is the chord of the arc) can be decreased to one-half or one-quarter of the lengths given in the table below, and the corresponding offset D will be respectively one-quarter and one-sixteenth of the lengths given in the table. In the table the length of the line C is taken at 100 feet for curves 1 to 12 degrees; 50 feet for curves of 13 to 24 degrees, and 25 feet for sharper curves; and for the reason that for the sharper curves the situation is usually so cramped that measuring the longer distances is impracticable. In the diagram the line R is the radius of the curve, but the formation of the ground where the curved track is to be laid is supposed to be such that it is impossible to fix a pin at the center of the circle and in this way, by using a line of the proper length, to describe the circle.

Rule for Measuring the Radius of a Sharp Curve



Stretch a string, say 20 feet long, or longer if the curve is not a sharp one, across the curve corresponding to the line from A to C in the diagram. Then measure from B, the center of the line A C, and at right angles with it, to the rail at D.

Multiply the distance A to B, or one-half the length of the string in inches, by itself; measure the distance D to B in inches, and multiply it by itself. Add these two products and divide the sum by twice the distance from B to D, measured exactly in inches and fractional parts of inches. This will give the radius of the curve in inches.

It may be more convenient to use a straight edge instead of a string. Care must be taken to have the ends of the string or straight edge touch the same part of the rail as is taken in measuring the distance from the center. If the string touches the bottom of the rail flange at each end, and the center measurement is made to the rail head, the result will not be correct.

In practice it will be found best to make trials on different parts of the curve to allow for irregularities. It is best not to measure across from one end of the curved track to the other even when the curve is so located that this is possible, since if any portion of the straight track at either end of the curve is included the results will be incorrect. This rule does not apply to curves of over one-half circle if the line is drawn connecting the two ends of the curve. It is a good plan to make the measurement on the *inside of the outer rail of the curve*, as this is often more convenient. In this case one-half of the width of gauge should be deducted from the radius when calculated, as the radius of the curve should be measured to the center of the track.

EXAMPLE.—Let A C be a 20-foot string; half the distance, or A B, is then 10 feet, or 120 inches. Suppose B D is found on measurement to be 3 inches. Then 120 multiplied by 120 is 14,400, and 3 multiplied by 3 is 9; 14,400 added to 9 is 14,409, which, divided by twice 3, or 6, equals 2,401½ inches, or 200 feet 1½ inches, which is the radius of the curve.

The formula is thus stated: $\frac{A\,B^2 + B\,D^2}{2\,B\,D} = R.$

Or applied to the above example, $\frac{120^2 + 3^2}{2 \times 3} = 2{,}401\tfrac{1}{2}$ in. = 200 ft. 1½ in.

Table of Radii and Deflections for Curves

Curve in Degrees	Radius R in Feet	Offset D in Feet C=100 Feet	Curve in Degrees	Radius R in Feet	Offset D in Feet C=50 Feet	Curve in Degrees	Radius R in Feet	Offset D in Feet C=25 Feet
1	5730	87	13	441	2.83	24	229	1.362
2	2865	1.74	14	410	3.05	26	220	1.405
3	1910	2.62	15	382	3.27	28	205	1.51
4	1433	3.49	16	358	3.48	30	191	1.615
5	1146	4 36	17	337	3 7	32	179	1.72
6	955	5.23	18	318	3.92	36	159	1.935
7	819	6.10	19	302	4 13	40	143	2.14
8	717	6.98	20	287	4.35	44	130	2.34
9	637	7.85	21	273	4.56	50	115	2.64
10	573	8.72	22	260	4.77	60	95	3.125
11	521	9.58	23	249	4.98			
12	478	10 45	24	239	5.2			

The offset D for given radius R and chord C is found from formula $D = \frac{C^2}{2R}$

NOTE.—For extremely sharp curves, say 20 to 50 feet radius, it is practicable to lay off the curve by the above method at $\frac{1}{12}$th the usual scale by using inches throughout instead of feet; for example, in case of a 30-foot radius curve (radius 360 inches) the formula for 16-degree curve, substituting inches for feet, using a 50-inch chord and 3.48-inch offset, will give sufficiently close results.

The Resistance of Curves

The frictional resistance to the passage of trains around curves is very considerable, and is also extremely variable. The shorter the radius of the curve the greater is the resistance; also the length of the wheel-bases of locomotive and of the cars, the elevation of the outer rail, the speed, the condition of track and rolling stock, the length of the train and the length of the curved track, and other matters influence the resistance, so that no one formula will apply to all cases. If the gauge of track on curves is not sufficiently widened to prevent the wheels from binding against the rails the resistance may be excessive.

Excessive or irregular curves, and especially sharp curves in connection with steep grades, are to be avoided, as they greatly decrease the loads which locomotives can handle, limit the amount of business practicable, and increase the cost of operation and the repairs required for track and rolling stock. It is preferable to increase the distance or the expense of track construction, rather than for sake of saving in first cost to lose continuously in operating expenses.

Compensation, or Reduction of Grade on Curves

It is customary, when a curve occurs on a grade, to reduce the grade on the curved part of the track so that the combined resistance of the flattened grade and the curve will not exceed the resistance of the steeper grade on the straight part of the track.

In practice most engineers compensate for curves on grades at the rate of **two one-hundredths of a foot** grade in each 100 feet for **each degree of curvature.**

EXAMPLE.—If a 20-degree curve comes on a grade of 5 feet per 100, the grade is reduced $20 \times \frac{2}{100} = \frac{4}{10}$ of 1 foot, which, subtracted from the original grade of 5 feet per 100 leaves $4\frac{6}{10}$ feet per 100 as the compensated grade on the curve; or, in other words, a grade of 5 feet in 100 coming on a straight track offers the same resistance as a grade of $4\frac{6}{10}$ feet in 100 coming on a 20-degree curve.

Where the grade is stated in feet per mile the equivalent reduction for each degree of curvature is $1\frac{56}{1000}$ feet per mile.

EXAMPLE.—A 20-degree curve coming on a grade of 264 feet per mile, the grade is reduced $20 \times 1\frac{56}{1000} = 21\frac{4}{100}$ feet, which, subtracted from 264, leaves $242\frac{88}{100}$ feet per mile as the compensated grade on the curved track.

The above rule works well within the limits of ordinary railroad practice where excessive grades and curves are not required. For short local roads, such as are used for mining and industrial purposes, where very heavy grades and very sharp curves are necessary, the rate of compensation should be increased. On narrow gauge **three one-hundredths of a foot** per degree of curvature gave the best results with 40-degree curves on 4 per cent. grades.

Sharper curves may be used on narrow gauge than on wide gauge, because there is less difference between the length of the inner and outer rails on curves of the same radius, and because narrow-gauge rolling stock usually has a shorter wheel-base.

Elevation of Outer Rail on Curves

In passing around curves the centrifugal force tends to tip over the rolling stock and to crowd the wheels against the outer rail. This tendency increases with increased speed, and is greater in the case of a sharp curve than an easy curve. To counteract this tendency—which at a very high rate of speed might derail the train—it is desirable to elevate the outer rail of a curved track so that the train will lean inward to such an extent that at the desired rate of speed there will be no more pressure against one rail than against the other. Where the same track is used for both slow and fast trains it is usual to elevate the outer rail to suit the fast train. Excessive speeds around very sharp curves are altogether impossible.

It is customary to elevate the outer rail one-half inch for each degree of curvature on roads of 56½-inch gauge of track, and for speeds of 25 to 35 miles per hour. For narrower gauges the elevation is proportionately less. Thus, if on standard (56½-inch) gauge with a speed of 30 miles per hour on a 10-degree (573 feet radius) curve the outer rail is elevated 5 inches, on a gauge of track 28¼ inches the elevation would be 2½ inches. The elevation of the outer rail on 36-inch gauge should be very nearly two-thirds of the elevation for 56½-inch gauge for the same speed around the same curve. The above rule is only approximate and requires modification for curves much sharper than 10 degrees and for speeds much less than 15 to 20 miles per hour. If the outer rail is elevated exactly the proper amount it will be impossible for a passenger to feel any sensation of tipping or rocking motion while the train is on the curve. The exact elevation to secure this result can only be arrived at in each case by very abstruse calculations. It is considered the best practice in approaching a curve to begin to make a difference in the level of the two rails some distance—say 50 or 100 feet—before the curve is reached, and to elevate the outer rail and depress the inner rail so that the center of the track is level. The best difference in level between the two rails on curved track can only be determined by actual trial after the track is complete.

Gauge of Track Widened on Curves

Theoretically, in order to pass around curves perfectly, every axle in the train should point to the center of the curve, and the outside wheels should be larger than the inner wheels. In practice, the difference in size of the wheels is supposed to be accomplished by coning the tread of each wheel so that the diameter close to the flange is greater than at the front face. But the radial position of the axles is impracticable, as cars and locomotives are built so that two or more axles are parallel. On sharp curves this arrangement of the axles causes the cars and locomotive to bind, a four-wheel car or truck having a tendency to press the front wheel against the outside rail and the rear wheel against the inside rail. On this account the usual amount of clearance between the rails and wheel flanges must be increased. The exact amount of additional width of gauge required on a curve depends on the radius of the curve, the gauge of track, and the wheel-bases of the rolling stock, and no rule can be given which will apply to all cases. The width of the tread of the wheels limits the amount of extra width of gauge practicable. Actual trial has proved that on narrow gauge, with locomotives and cars of short wheel-base and with sharp curves, that a good rule is to widen the gauge of track **one-sixteenth of an inch** for each 2½ degrees of curvature; *i. e.*, a 40-degree curve calls for one inch increase in gauge of track. On extremely sharp curves, such as are often used about manufactories, mines, etc., it is well to widen the gauge as much as can be done and still secure a safe amount of bearing on the rail for the car wheels, allowing for wear of flanges and for wheels hugging one rail.

SWITCHES AND FROGS.

Rules for the Use of Roadmasters.

(By D. H. LOVELL, C. E. From "THE OFFICIAL RAILWAY LIST.")

Split Switches.

The rule for the theoretical lead of a split switch for any gauge is: Twice the gauge of the track multiplied by the number or proportion of the frog; or, for 4 ft. 8½ in. and 4 ft. 9 in. gauges the lead is 9½ times number of frog, and for 5 ft. gauge 10 times number of frog.

THEORETICAL LEADS.

3 Ft. Gauge.		4 Ft. 8½ In. Gauge.			4 Ft. 9 In. Gauge.			5 Ft. Gauge.	
No. Frog	Lead.	No. Frog	Lead.		No. Frog	Lead.		No. Frog	Lead.
	Ft.		Ft.	In.		Ft.	In.		Ft.
4.....	24	6.....	52	6	6.....	57	0	6.....	60
5.....	30	7.....	65	11	7.....	66	6	7.....	70
6.....	36	8.....	75	4	8.....	76	0	8.....	80
7.....	42	9.....	84	9	9.....	85	6	9.....	90
8.....	48	10.....	94	2	10.....	95	0	10.....	100
9.....	54	11.....	103	7	11.....	104	6	11.....	110
10.....	60	12.....	113	0	12.....	114	0	12.....	120
11.....	66	15.....	141	3	15.....	142	6	15.....	150

In practice the above are found to be too long. For shortened leads, which will be found to work well in practice, the following rule is given: For 4 ft. 8½ in. and 4 ft. 9 in. gauges the lead for all the frogs up to and including a No. 6 is 9½ times No. of frog; for Nos. 7 and 8, 9 times No. of frog; for Nos. 9 and 10, 8½ times No. of Frog; and for all above No. 10, 8 times No. of frog.

For 5 ft. gauge add ½ to each of the preceding multipliers. No. 6 multiplied by 9½ will then be No. 6 multiplied by 10 equals 60 ft., which is the lead for No. 6 frog and 5 ft. gauge.

SHORTENED LEADS.

4 Ft. 8½ In. and 4 Ft. 9 In. Gauges.				5 Feet Gauge.			
No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.
6×9½.....	=57′ 0″	10×8½.....	= 85′	6×10	=60′ 0″	10×9	= 90′ 0″
7×9	=63′	11×8	= 88′	7×9½.....	=66′ 6″	11×8½.....	= 93′ 6″
8×9	=72′	12×8	= 96′	8×9½.....	=76′	12×8½.....	=102′
9×8½.	=76′ 6″	15×8	=120′	9×9	=81′	15×8½.....	=127′ 6″

The above shorted leads may be varied from when it is expedient to do so, to avoid waste of rail by cutting or to suit the material.

STUB SWITCHES.

The lead for a stub switch for 4 feet 8½ inch and 4 feet 9 inch gauges is 6¾ (6.75) times number of frog for 5 inch throw, and 6½ (6.5) times number of frog for 5¾ inch throw. For 5 feet gauge and 5 inch or 5¾ inch throw the lead is 7 times number of frog. The stub lead should not be shortened; it and the length of switch rail should be equal, or nearly so, to the full theoretical lead.

5 INCH THROW.		5¾ INCH THROW.		5 AND 5¾ INCH THROW.	
4 feet 8½ inch and 4 feet 9 inch Gauges.		4 feet 8½ inch and 4 feet 9 inch Gauges.		5 foot Gauge.	
No. Frog.	Lead.	No. Frog.	Lead.	No. Frog.	Lead.
6×6¾	= 40′ 6″	6×6½	= 39′ 0″	6×7	= 42′
7×6¾	= 47′ 4″	7×6½	= 45′ 6″	7×7	= 49′
8×6¾	= 54′	8×6½	= 52′	8×7	= 56′
9×6¾	= 60′ 9″	9×6½	= 58′ 6″	9×7	= 63′
10×6¾	= 67′ 6″	10×6½	= 65′	10×7	= 70′

For Length of Moving Rail—Stub Switch.

For 4 feet 8½ inch and 4 feet 9 inch gauges and 5 inch throw the length of moving rail is 2¾ (2.75) times number of frog For 4 feet 8½ inch and 4 feet 9 inch gauges and 5¾ inch throw, and for 5 feet gauge and 5 and 5¾ inch throw, it is 3 times number of frog.

4 FEET 8½ INCH AND 4 FEET 9 INCH GAUGES AND 5 INCH THROW. 5 FEET GAUGE AND 5 AND 5¾ INCH THROWS.			4 FEET 8½ INCH AND 4 FEET 9 INCH GAUGES AND 5¾ INCH THROW 5 FEET GAUGE AND 5 AND 5¾ INCH THROW		
2¾ (2.75) Times No. of Frog.			3 Times No. of Frog.		
No. Frog.			No. Frog.		
6×2¾	= 16′ 6″	moving rail.	6×3	= 18′	moving rail.
7×2¾	= 19′ 3″	" "	7×3	= 21′	" "
8×2¾	= 22′	" "	8×3	= 24′	" "
9×2¾	= 24′ 9″	" "	9×3	= 27′	" "
10×2¾	= 27′ 6″	" "	10×3	= 30′	" "

As all the preceding is presented in a way to be intelligible and useful to the trackman, it is hardly to be expected that it will check theoretically, but it will be found to nearly do so.

Crossing Between Parallel Tracks.

From the distance between gauge lines of parallel tracks subtract the gauge of the track; multiply the remainer by the number of the frog, and it will give the distance between the frog points measured along with, not diagonally across, the parallel tracks. The distance between gauge lines to be taken as the distance between the tracks.

Example.—Distance between tracks, 7 feet; 4 feet 8½ inch gauge and No. 10 frog. 7 feet– 4 feet 8½ inches=2 feet 3½ inches. 2 feet 3½ inches ×10=22 feet 11 inches, the distance between frog points.

TO FIND THE ANGLE OF A FROG.

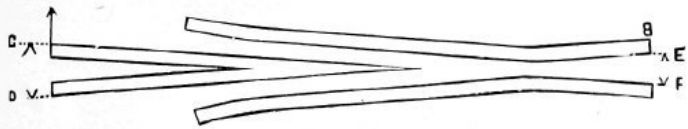


FIG. 894.

Divide the distance A B by the sum of the distances C D and E F For example, suppose A B to equal 72 inches, C D 8 inches, and E F 4 inches; then 72 divided by 12 equals 6. Angle or spread of frog is 1 in 6.

TABLE FOR PUTTING IN FROGS AND SWITCHES.

Proportion of Frog.	Length of Frog.	Angle of Frog.	Radius of Curve.	Distance from head Block to Point of Frog.	Crotch Frog. Proportion of Frog	Crotch Frog. Length of Frog.	Crotch Frog. Distance from He'd Blc'k to Point of Frog.	
1 to 4	5 feet	14° 15′	165 feet	28 feet	1 to 3	4 ft.	17 ft.	Gauge 5 feet. 5 inch throw.
1 " 5	5 "	11° 25′	254 "	35 "	1 " 3⅔	4 "	21 "	
1 " 6	6 "	9° 32′	365 "	42 "	1 " 4⅓	5 "	25 "	
1 " 7	7 "	8° 10′	566 "	48 "	1 " 5	5 "	28 "	
1 " 8	8 "	7° 09′	642 "	57 "	1 " 5⅔	5 " 8 in.	34 "	
1 " 9	9 "	6° 21′	811 "	64 "	1 " 6⅓	6 " 4 "	38 "	
1 " 10	10 "	5° 44′	1005 "	71 "	1 " 7	7 "	41 "	
1 " 11	11 "	5° 12′	1210 "	78 "	1 " 7⅔	7 " 8 "	45 "	
1 " 12	12 "	4° 46′	1400 "	86 "	1 " 8⅓	8 " 4 "	50 "	
1 " 4	5 "	14° 15′	155 "	26 "	1 " 3	4 "	16 "	Gauge 4′ 8½ in. 5 inch throw.
1 " 5	5 "	11° 25′	239 "	32 "	1 " 3⅔	4 "	20 "	
1 " 6	6 "	9° 32′	345 "	39 "	1 " 4⅓	5 "	23 "	
1 " 7	7 "	8° 10′	431 "	46 "	1 " 5	5 "	28 "	
1 " 8	8 "	7° 09′	606 "	52 "	1 " 5⅔	5 " 8 in.	31 "	
1 " 9	9 "	6° 21′	764 "	59 "	1 " 6⅓	6 " 4 "	35 "	
1 " 10	10 "	5° 44′	979 "	65 "	1 " 7	7 "	37 "	
1 " 11	11 "	5° 12′	1096 "	73 "	1 " 7⅔	7 " 8 "	42 "	
1 " 12	12 "	4° 46′	1246 "	80 "	1 " 8⅓	8 " 4 "	46 "	
1 " 4	4 "	14° 15′	102 "	14 "	1 " 3	4 "	8 "	Gauge 3 feet. 5 inch throw.
1 " 5	5 "	11° 25′	154 "	19 "	1 " 3⅔	4 "	11 "	
1 " 6	6 "	9° 32′	220 "	23 "	1 " 4⅓	4 "	13 "	
1 " 7	7 "	8° 10′	296 "	27 "	1 " 5	5 "	15 "	
1 " 8	8 "	7° 09′	388 "	32 "	1 " 5⅔	5 "	18 "	
1 " 9	9 "	6° 21′	486 "	36 "	1 " 6⅓	6 "	20 "	
1 " 10	10 "	5° 44′	606 "	41 "	1 " 7	7 "	22 "	
1 " 11	11 "	5° 12′	732 "	45 "	1 " 7⅔	7 "	25 "	
1 " 12	12 "	4° 46′	866 "	50 "	1 " 8⅓	8 "	27 "	

Full Split Switch, place heel of switch same distance from point of frog as head block.

8 feet switch points are suitable for frogs 1 to 4, 1 to 5, or 1 to 6.
10 " " " " " " " 1 to 7, 1 to 8, or 1 to 9.
15 " " " " " " " 1 to 10, 1 to 11, or 1 to 12.

AMOUNT IN TONS OF RAILS OF VARIOUS PATTERNS TO LAY ONE MILE OF TRACK.

Weight per Yard	Tons per Mile	Weight per Yard	Tons per Mile
8 lbs.	$12\frac{1280}{2240}$	65 lbs.	$102\frac{320}{2240}$
9 "	$14\frac{320}{2240}$	66 "	$103\frac{1600}{2240}$
10 "	$15\frac{1600}{2240}$	67 "	$105\frac{640}{2240}$
12 "	$18\frac{1920}{2240}$	68 "	$106\frac{1920}{2240}$
14 "	22	70 "	110
16 "	$25\frac{320}{2240}$	71 "	$111\frac{1280}{2240}$
20 "	$31\frac{960}{2240}$	72 "	$113\frac{320}{2240}$
25 "	$39\frac{640}{2240}$	73 "	$114\frac{1600}{2240}$
30 "	$47\frac{320}{2240}$	75 "	$117\frac{1920}{2240}$
35 "	55	78 "	$122\frac{1280}{2240}$
40 "	$62\frac{1920}{2240}$	80 "	$125\frac{1600}{2240}$
45 "	$70\frac{1600}{2240}$	82 "	$128\frac{1920}{2240}$
48 "	$75\frac{1920}{2240}$	85 "	$133\frac{1280}{2240}$
50 "	$78\frac{1280}{2240}$	88 "	$138\frac{940}{2240}$
52 "	$81\frac{1600}{2240}$	90 "	$141\frac{960}{2240}$
56 "	88	92 "	$144\frac{1280}{2240}$
57 "	$89\frac{1280}{2240}$	95 "	$149\frac{640}{2240}$
60 "	$94\frac{640}{2240}$	98 "	154
61 "	$95\frac{1920}{2240}$	100 "	$157\frac{320}{2240}$
63 "	99		

To find the number of tons required per mile of single track, mult'ply the weight per yard by 11 and divide the result by 7.

RAILROAD SPIKES.

Size Measured under Head.	Average No. per Keg of 200 lbs.	Ties 2 ft. between Centers, 4 Spikes per Tie requires per Mile.	Rail Used. Weight per Yard.
6 x $\frac{9}{16}$	320	6600 lbs.—32 kegs.	
$5\frac{1}{2}$ x $\frac{9}{16}$	375	5870 " —30 "	45 to 100
5 x $\frac{9}{16}$	400	5170 " —26 "	40 to 56
5 x $\frac{1}{2}$	450	4660 " —$23\frac{1}{2}$ "	35 to 40
$4\frac{1}{2}$ x $\frac{1}{2}$	530	3960 " —20 "	
$4\frac{1}{2}$ x $\frac{7}{16}$	680	3110 " —$15\frac{1}{2}$ "	25 to 35
4 x $\frac{1}{2}$	600	3520 " —$17\frac{2}{5}$ "	
4 x $\frac{7}{16}$	720	2910 " —$14\frac{3}{4}$ "	
4 x $\frac{3}{8}$	1000	2090 " —$10\frac{1}{2}$ "	
$3\frac{1}{2}$ x $\frac{1}{2}$	800	2200 " —11 "	
$3\frac{1}{2}$ x $\frac{7}{16}$	900	2350 " —12 "	16 to 25
$3\frac{1}{2}$ x $\frac{3}{8}$	1190	1780 " — 9 "	
3 x $\frac{3}{8}$	1240	1710 " — $8\frac{1}{2}$ "	
$2\frac{1}{2}$ x $\frac{3}{8}$	1342	1575 " — $7\frac{7}{8}$ "	12 to 16

JOINTS.

Splice Plates and Bolts Required for One Mile Single Track.

Length of Rail.	Complete Joints.	Splice Plates.	Bolts, 4 to a Joint.
All 21 feet.	503	1006	2012
" 24 "	440	880	1760
" 26 "	406	812	1624
" 28 "	377	754	1508
" 30 "	352	704	1408
90 per cent. 30 feet.	358	716	1432
10 " shorter.			

If 6 bolts to a joint, one-half more bolts will be required.

NUMBER OF TRACK BOLTS IN A KEG OF 200 LBS. AND NUMBER OF KEGS REQUIRED PER MILE.

Size Bolt	Size Nut	Square Nuts	Hex. Nuts	Kegs per Mile
⅞ x 4¾	1½ x ⅞	149	156	9.46
⅞ x 4½	1 7/16 x ⅞	151	158	9.33
⅞ x 4½	1½ x ⅞	153	160	9.21
⅞ x 4½	1 7/16 x ⅞	155	163	9.09
⅞ x 4¼	1½ x ⅞	157	165	8.97
⅞ x 4¼	1 7/16 x ⅞	159	168	8.86
⅞ x 4	1½ x ⅞	161	170	8.75
⅞ x 4	1 7/16 x ⅞	163	173	8.64
¾ x 4¼	1⅜ x ¾	215	228	6.55
¾ x 4¼	1¼ x ¾	234	240	6.02
¾ x 4	1⅜ x ¾	222	236	6.35
¾ x 4	1¼ x ¾	241	248	5.85
¾ x 3¾	1⅜ x ¾	229	244	6.15
¾ x 3¾	1¼ x ¾	249	257	5.66
¾ x 3½	1⅜ x ¾	236	253	5.97
¾ x 3½	1¼ x ¾	258	266	5.46
¾ x 3¼	1⅜ x ¾	243	261	5 80
¾ x 3¼	1¼ x ¾	266	275	5.30
¾ x 3	1⅜ x ¾	250	270	5.64
¾ x 3	1¼ x ¾	276	286	5.11
⅝ x 3	1¼ x ⅝	366	395	3.85
⅝ x 3	1 1/16 x ⅝	436	459	3.23
⅝ x 2¾	1¼ x ⅝	379	410	3.72
⅝ x 2¾	1 1/16 x ⅝	448	479	3.15
⅝ x 2½	1¼ x ⅝	390	425	3.61
⅝ x 2½	1 1/16 x ⅝	460	498	3.07
9/16 x 2½	1⅛ x 9/16	515	555	2.74
9/16 x 2¼	1⅛ x 9/16	547	593	2 58
½ x 2½	1 x ½	733	760	1 93
½ x 2	1 x ½	793	820	1.78

The number of kegs per mile is for 30-foot rails with four-hole joints; for six-hole joints increase above figures one-half. For 28-foot, 26-foot and 24-foot rails add 6⅔ per cent, 13⅓ per cent and 20 per cent, respectively.

NUMBER OF COMPLETE JOINTS TO THE TON OF RAILS.

Weight of Rail per Yard, Lbs.	Length of Rails, 24 Feet	Length of Rails, 26 Feet	Length of Rails, 28 Feet	Length of Rails, 30 Feet	Length of Rails, 30 Ft. + 10 per cent shorter
8	35.00	32 30	31.10	28.00	28.67
12	23.33	21.53	20.74	18 66	19.09
16	17.50	16.15	15 55	14.00	14.33
20	14.00	12.92	12.44	11.20	11.25
25	11.20	10.32	9.95	8.96	9.16
30	9.83	8.60	8.29	7.46	7.64
35	8.00	7.38	7.11	6.40	6.55
40	7.00	6.45	6.22	5 60	5.73
45	6.22	5.74	5.52	4.97	5.09
50	5.60	5.16	4.97	4.48	4.58
55	5.09	4.69	4.52	4.07	4.14
56	5.00	4.61	4.44	4.00	4.09
60	4.66	4.30	4.14	3.73	3.82
65	4.30	3.97	3.82	3.44	3.52
70	.....	.....	.....	3.20	3.27
75	.....	.....	.....	2.98	3.05
80	.....	.....	.....	2.80	2.86
85	.....	.....	.....	2.63	2.70
90	.....	.....	.....	2.49	2.53
95	.....	.....	.....	2.35	2.39
100	.....	.....	.....	2.24	2.30

CROSS-TIES PER MILE.

Centre to Centre.	Ties.	Centre to Centre.	Ties.
18 inches	3520	27 inches	2348
21 "	3017	30 "	2113
24 "	2640		

Memorandum of Weights and Capacities of Cars for Use in Estimating Weights of Trains

	Narrow Gauge		Wide Gauge	
	Weight of Car	Weight of Load	Weight of Car	Weight of Load
	Pounds	Pounds	Pounds	Pounds
8-wheel flat and gondola cars	8,000	20,000	18,000 to 20,000	40,000
" " " "	10,000	24,000	21,000 " 23,000	50,000
" " " "	14,000	32,000	24,000 " 25,000	60,000
" " " "	.....	.....	29,000 " 32,000	80,000
" " " "	.....	.....	33,000 " 35,000	100,000
8-wheel box cars	10,000	20,000	20,000 " 24,000	40,000
" " "	13,000	24,000	25,000 " 27,000	50,000
" " "	16,000	32,000	28,000 " 30,000	60,000
" " "	.....	.....	32,000 " 35,000	80,000
" " "	.....	.....	35,000 " 39,000	100,000
4-wheel flat car	4,500	12,000		
4-wheel coal and ore hopper car	6,000	12,000	9,000	20,000
4-wheel box car	6,500	12,000		
8-wheel passenger coach	22,000	52 passengers, seated	44,000	56 passengers, seated
Light 8-wheel open excursion coach	9,700	60 passengers, seated	18,000	80 passengers, seated
Light 8-wheel coach for motor lines, surburban roads, etc.	10,000	40 passengers, seated	10,000	40 passengers, seated

Weights and Capacities of Street Cars

Usual gauges of track, 56½, 60 and 62½ inches.

4-wheel, 1-horse street car, 16 to 18 ft. long, 3,500 lbs., seating 16 passengers.
" 2- " " " 23 " 25 " " 5,000 " " 28 "

NOTE—Passengers average 15 per ton of 2,000 pounds.

Weights and Capacities of Logging Cars

36 to 56½ inches gauge of track.

MEMO.—The bunks of logging cars for narrow gauge are shorter than for wide gauge and logs must be piled higher than for wide gauge; for this reason standard gauge is usually preferable to narrow for logging.

	Weight	Capacity
4-wheel logging cars	3,000 lbs.	1,000 ft. of logs = 8,000 to 10,000 lbs.
" " "	5,000 "	2,000 " " = 16,000 " 20,000 "
" " "	6,000 "	2,500 " " = 20,000 " 25,000 "
8-wheel " "	6,900 "	2,000 to 2,500 ft. of logs = 16,000 to 25,000 lb.
" " "	8,400 "	3,000 " 3,500 " " = 24,000 " 35,000 "
" " "	9,600 "	4,000 " 4,500 " " = 32,000 " 45,000 "
" " "	11,000 "	5,000 ft. of logs = 40,000 to 50,000 lbs.

Weights and Capacities of Contractors' Cars and Industrial Dump Cars

Four wheels; usual gauge of track 36 inches

	Weight of Empty Car	Average Weight of Load
1 cubic yard capacity	1,400 lbs.	3,000 lbs.
1½ " " "	2,100 "	4,500 "
2 " " "	2,500 "	6,000 "
2½ " " "	3,000 "	7,500 "
3 " " "	4,000 "	9,000 "
4 " " "	5,000 "	12,000 "

Weights and Capacities of Colliery Cars

Four wheels; usual gauge of track 36 to 44 inches

Approximate Capacity	Weight of Empty Car	Average Weight of Load
15 bushels "run of mine" coal	500 lbs.	1,200 lbs. bituminous coal
20 " " " "	600 "	1,500 " " "
25 " " " "	850 "	1,900 " " "
30 " " " "	950 "	2,300 " " "
33 " " " "	1,050 "	2,500 " " "
35 " " " "	1,150 "	2,700 " " "
40 " " " "	1,250 "	3,000 " " "
46 " " " "	1,400 "	3,500 " " "
54 " " " "	1,700 "	4,100 " " "
2½ "long" tons coal	2,000 "	5,700 " anthracite coal
3 " " "	2,500 "	6,700 " " "

Table of Cubic Yards of Ballast per Mile.

Side-slope of the Ballast 1 to 1. Width in clear between tracks of double-track road, 6 feet.

Depth in Inches.	Top Width, Single Track.			Top Width, Double Track		
	10 Ft.	11 Ft.	12 Ft.	21 Ft.	22 Ft.	23 Ft.
	Cubic Yds.	Cubic Yds.	Cubic Yds.	Cubic Yds.	Cubic Yds.	Cubic Yds.
12	2,152	2,347	2,543	4,303	4,499	4,695
18	3,374	3,667	3,960	6,600	6,894	7,188
24	4,694	5,085	5,474	8,996	9,388	9,780
30	6,111	6,600	7,087	11,490	11,980	12,470

WEIGHTS OF ROUND AND SQUARE STEEL

Per lineal foot. One cubic foot of steel weighs 490 lbs.

Sizes in Inches	● Weight in Lbs.	■ Weight in Lbs.	Sizes in Inches	● Weight in Lbs.	■ Weight in Lbs.	Sizes in Inches	● Weight in Lbs.	■ Weight in Lbs.
1/16	.010	.013	4 1/16	44.07	56.11	8 1/16	173.6	221.0
1/8	.042	.053	4 1/8	45.44	57.85	8 1/8	176.3	224.5
3/16	.094	.119	4 3/16	46.83	59 62	8 3/16	179.0	228.0
1/4	.167	.212	4 1/4	48.24	61.41	8 1/4	181.8	231.4
5/16	.261	.333	4 5/16	49.66	63.23	8 5/16	184.5	234.9
3/8	.375	.478	4 3/8	51.11	65.08	8 3/8	187.3	238.5
7/16	.511	.651	4 7/16	52.58	66.95	8 7/16	190.1	242.0
1/2	.667	.850	4 1/2	54.07	68.85	8 1/2	193.0	245.6
9/16	.845	1.076	4 9/16	55.59	70.78	8 9/16	195.7	249.3
5/8	1.043	1.328	4 5/8	57.12	72.73	8 5/8	198.7	252.9
11/16	1.262	1.608	4 11/16	58 67	74.70	8 11/16	201.6	256.6
3/4	1.502	1.913	4 3/4	60.25	76.71	8 3/4	204.4	260.3
13/16	1.773	2.245	4 13/16	61.84	78 74	8 13/16	207.4	264.1
7/8	2.044	2.603	4 7/8	63.46	80.81	8 7/8	210.3	267.9
15/16	2.347	2.989	4 15/16	65.10	82.89	8 15/16	213.3	271.6
1	2.670	3.400	**5**	66.76	85.00	**9**	216.3	275.4
1 1/16	3.014	3.838	5 1/16	68.44	87.14	9 1/16	219.3	279.3
1 1/8	3.379	4.303	5 1/8	70.14	89.30	9 1/8	222.4	283.2
1 3/16	3.766	4.795	5 3/16	71.86	91.49	9 3/16	225.4	287.0
1 1/4	4.173	5.312	5 1/4	73.60	93.72	9 1/4	228.5	290.9
1 5/16	4.600	5.857	5 5/16	75.37	95.96	9 5/16	231.5	294.9
1 3/8	5.049	6.428	5 3/8	77.15	98.23	9 3/8	234.7	298.9
1 7/16	5.518	7.026	5 7/16	78.95	100.5	9 7/16	237.9	302.8
1 1/2	6.008	7.650	5 1/2	80.77	102.8	9 1/2	241.0	306.8
1 9/16	6.520	8.301	5 9/16	82.62	105.2	9 9/16	244.2	310.9
1 5/8	7.051	8.978	5 5/8	84.49	107.6	9 5/8	247.4	315.0
1 11/16	7.604	9 682	5 11/16	86.38	110 0	9 11/16	250.6	319.1
1 3/4	8.178	10.41	5 3/4	88.29	112.4	9 3/4	253.9	323.2
1 13/16	8.773	11.17	5 13/16	90.22	114.9	9 13/16	257.1	327.4
1 7/8	9.388	11.95	5 7/8	92.17	117.4	9 7/8	260.4	331.6
1 15/16	10.02	12.76	5 15/16	94.14	119.9	9 15/16	263.7	335.8
2	10.68	13.60	**6**	96.14	122.4	**10**	267.0	340.0
2 1/16	11.36	14.46	6 1/16	98 14	125.0	10 1/16	270.4	344.3
2 1/8	12.06	15.35	6 1/8	100.2	127.6	10 1/8	273.8	348.5
2 3/16	12.78	16.27	6 3/16	102 2	130.2	10 3/16	277 1	352.9
2 1/4	13.52	17.22	6 1/4	104.3	132.8	10 1/4	280 6	357.2
2 5/16	14 28	18.19	6 5/16	106.4	135 5	10 5/16	284 0	361.6
2 3/8	15 07	19.18	6 3/8	108.5	138 2	10 3/8	287 4	366.0
2 7/16	15.86	20.20	6 7/16	110.7	140.9	10 7/16	290.9	370.4
2 1/2	16.69	21.25	6 1/2	112.8	143.6	10 1/2	294.4	374.9
2 9/16	17 53	22.33	6 9/16	114 9	146 5	10 9/16	297.9	379.4
2 5/8	18.40	23.43	6 5/8	117.2	149.2	10 5/8	301.4	383.8
2 11/16	19.29	24.56	6 11/16	119.4	152.1	10 11/16	305.0	388.3
2 3/4	20.20	25.00	6 3/4	121.7	154.9	10 3/4	308.6	392.9
2 13/16	21.12	26.90	6 13/16	123.9	157 8	10 13/16	312.2	397.5
2 7/8	22.07	28 10	6 7/8	126 2	160 8	10 7/8	315 8	402.1
2 15/16	23 04	29 34	6 15/16	128.5	163.6	10 15/16	319 5	406.8
3	24.03	30.60	**7**	130.9	166.6	**11**	323.1	411.4
3 1/16	25.04	31 89	7 1/16	133.2	169.6	11 1/16	326.8	416.1
3 1/8	26.08	33 20	7 1/8	135.6	172 6	11 1/8	330.5	420.9
3 3/16	27.13	34 55	7 3/16	137.9	175.6	11 3/16	334.3	425.5
3 1/4	28 20	35.92	7 1/4	140.4	178.7	11 1/4	337.9	430.3
3 5/16	29.30	37.31	7 5/16	142.8	181.8	11 5/16	341 7	435.1
3 3/8	30.42	38 73	7 3/8	145.3	184.9	11 3/8	345.5	439.9
3 7/16	31.56	40.18	7 7/16	147.7	188.1	11 7/16	349.4	444.8
3 1/2	32.71	41.65	7 1/2	150.2	191.3	11 1/2	353.1	449.6
3 9/16	33.90	43.14	7 9/16	152.7	194.4	11 9/16	357.0	454.5
3 5/8	35.09	44 68	7 5/8	155.2	197.7	11 5/8	360.9	459.5
3 11/16	36 31	46.24	7 11/16	157.8	200.9	11 11/16	364.8	464.4
3 3/4	37.56	47.82	7 3/4	160.3	204.2	11 3/4	368 6	469.4
3 13/16	38.81	49.42	7 13/16	163.0	207 6	11 13/16	372 6	474.4
3 7/8	40.10	51.05	7 7/8	165 6	210.8	11 7/8	376 6	479.5
3 15/16	41.40	52.71	7 15/16	168.2	214.2	11 15/16	380.6	484.5
4	42.73	54.40	**8**	171.0	217.6	.....	.....	.....

For iron figure 2% less.

WEIGHTS OF STEEL ANGLES

EQUAL LEGS.

	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
8 x8	....	....	....	....	....	....	26.4	29.5	32.7	35.8	38.9	42.	45.	48.	51.
6 x6	....	....	....	....	14.8	17.2	19.6	21.9	24.2	26.5	28.7	30.9	33.1	35.3	37.4
5 x5	....	....	....	....	12.3	14.3	16.2	18.1	20.	21.8	23.6	25.4	27.2	28.9	30.6
4 x4	....	5.2	6.6	8.2	9.8	11.3	12.8	14.3	15.7	17.1	18.5	19.9	....	....	....
3½x3½	....	....	5.7	7.1	8.5	9.8	11.1	12.3	13.6	14.8	16.	17.1	....	....	....
3¼x3¼	....	....	....	....	7.8	9.0	10.2	11.4	12.5	13.6	14.7	....	....	....	....
3 x3	2.6	3.8	4.9	6.1	7.2	8.4	9.4	10.4	11.4	12.4	13.4	14.4	....	....	....
2¾x2¾	2.4	3.5	4.5	5.5	6.6	7.6	8.5	....	....	....	....	....	....	....	....
2½x2½	2.1	3.	4.1	5.	5.9	6.8	7.7	8.5	9.3	10.1	....	....	....	....	....
2¼x2¼	1.9	2.8	3.7	4.5	5.3	6.1	6.8	....	....	....	....	....	....	....	....
2 x2	1.7	2.5	3.2	4.	4.7	5.3	....	....	....	....	....	....	....	....	....
1¾x1¾	1.4	2.1	2.8	3.4	4.	4.6	....	....	....	....	....	....	....	....	....
1½x1½	1.2	1.8	2.4	2.9	3.4	....	....	....	....	....	....	....	....	....	....
1¼x1¼	1.	1.5	1.9	2.4	....	....	....	....	....	....	....	....	....	....	....
1⅛x1⅛	.9	1.3	1.7	2.1	....	....	....	....	....	....	....	....	....	....	....
1 x1	.8	1.2	1.5	....	....	....	....	....	....	....	....	....	....	....	....
⅞x ⅞	.7	1.	....	....	....	....	....	....	....	....	....	....	....	....	....
¾x ¾	.6	.8	....	....	....	....	....	....	....	....	....	....	....	....	....
⅝x ⅝	.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....

UNEQUAL LEGS.

	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
7 x3½	....	....	....	....	....	15.	17.	19.	21.	23.	24.9	26.8	28.7	30.5	32.3
6 x4	....	....	....	....	12.3	14.3	16.2	18.1	20.	21.8	23.6	25.4	27.2	28.9	30.6
6 x3½	....	....	....	....	11.7	13.5	15.3	17.1	18.9	20.6	22.3	24.	25.7	27.3	28.9
5 x4	....	....	....	....	11.	12.8	14.5	16.2	17.8	19.5	21.1	22.6	24.2	....	....
5 x3½	....	....	....	8.7	10.4	12.	13.6	15.2	16.8	18.3	19.8	21.3	22.7	....	....
5 x3	....	....	....	8.2	9.8	11.3	12.8	14.2	15.7	17.1	18.5	19.9	....	....	....
4½x3	....	....	....	7.7	9.1	10.5	11.9	13.3	14.6	15.9	17.2	18.5	....	....	....
4 x3½	....	....	....	7.7	9.1	10.5	11.9	13.3	14.6	15.9	17.2	18.5	....	....	....
4 x3	....	....	....	7.1	8.5	9.8	11.1	12.3	13.6	14.8	16.	17.1	....	....	....
3½x3	....	....	5.3	6.6	7.8	9.1	10.2	11.4	12.5	13.6	14.7	15.7	....	....	....
3½x2½	....	....	4.9	6.1	7.2	8.3	9.4	10.4	11.4	12.4	....	....	....	....	....
3½x2	....	3.4	4.5	5.5	6.5	7.5	8.5	9.5	....	....	....	....	....	....	....
3¼x2	....	....	4.3	5.3	6.2	7.2	8.1	9.	....	....	....	....	....	....	....
3 x2½	....	3.4	4.5	5.5	6.5	7.5	8.5	9.5	....	....	....	....	....	....	....
3 x2	....	3.1	4.1	5.	5.9	6.8	7.7	....	....	....	....	....	....	....	....
2½x2	....	2.8	3.7	4.5	5.3	6.1	6.8	....	....	....	....	....	....	....	....
2½x1¾	....	2.6	3.4	4.3	5.3	....	....	....	....	....	....	....	....	....	....
2½x1½	....	2.4	3.2	3.9	4.6	....	....	....	....	....	....	....	....	....	....
2¼x1½	....	2.3	3.1	3.7	4.3	5.	5.5	....	....	....	....	....	....	....	....
2 x1½	1.5	2.1	2.8	3.4	4.	....	....	....	....	....	....	....	....	....	....
2 x1⅜	....	2.	2.7	3.3	3.8	....	....	....	....	....	....	....	....	....	....
1¾x1½	....	2.	2.6	3.3	3.9	....	....	....	....	....	....	....	....	....	....
1¼x1	1.	....	1.8	....	....	....	....	....	....	....	....	....	....	....	....
1⅛x ⅞	.9	1.3	1.7	....	....	....	....	....	....	....	....	....	....	....	....
1 x ¾	.8	1.	....	....	....	....	....	....	....	....	....	....	....	....	....
1 x ⅝	.7	.9	1.4	....	....	....	....	....	....	....	....	....	....	....	....

STANDARD GAUGES

U. S. STANDARD GAUGE					BIRMINGHAM GAUGE			
No. of Gauge	Thickness in Inches		Weight Square Foot		No. of Gauge	Thickness in Inches	Weight Square Foot	
	Fractions	Decimals	Iron	Steel			Iron	Steel
7-0's	1-2	.5	20.00	20.4	.....	.....	.....	.....
6-0's	15-32	.46875	18.75	19.125	.....	.....	.....	.....
5-0's	7-16	.4375	17.50	17.85	.....	.....	.....	.....
0000	13-32	.40625	16.25	16.575	0000	.454	18.22	18.46
000	3-8	.375	15.	15.30	000	.425	17.05	17.28
00	11-32	.34375	13.75	14.025	00	.38	15.25	15.45
0	5-16	.3125	12.50	12.75	0	.34	13.64	13.82
1	9-32	.28125	11.25	11.475	1	.3	12.04	12.20
2	17-64	.265625	10.625	10.8375	2	.284	11.40	11.55
3	1-4	.25	10.	10.2	3	.259	10.39	10.53
4	15-64	.234375	9.375	9.5625	4	.238	9.55	9.68
5	7-32	.21875	8.75	8.925	5	.22	8.83	8.95
6	13-64	.203125	8.125	8.2875	6	.203	8.15	8.25
7	3-16	.1875	7.5	7.65	7	.18	7.22	7.32
8	11-64	.171875	6.875	7.0125	8	.165	6.62	6.71
9	5-32	.15625	6.25	6.375	9	.148	5.94	6.02
10	9-64	.140625	5.625	5.7375	10	.134	5.38	5.45
11	1-8	.125	5.	5.1	11	.12	4.82	4.88
12	7-64	.109375	4.375	4.4625	12	.109	4.37	4.43
13	3-32	.09375	3.75	3.825	13	.095	3.81	3.86
14	5-64	.078125	3.125	3.1875	14	.083	3.33	3.37
15	9-128	.0703125	2.8125	2.86875	15	.072	2.89	2.93
16	1-16	.0625	2.5	2.55	16	.065	2.61	2.64
17	9-160	.05625	2.25	2.295	17	.058	2.33	2.36
18	1-20	.05	2.	2.04	18	.049	1.97	1.99
19	7-160	.04375	1.75	1.785	19	.042	1.69	1.71
20	3-80	.0375	1.50	1.53	20	.035	1.40	1.42
21	11-320	.034375	1.375	1.4025	21	.032	1.28	1.30
22	1-32	.03125	1.25	1.275	22	.028	1.12	1.14
23	9-320	.028125	1.125	1.1475	23	.025	1.00	1.02
24	1-40	.025	1.	1.02	24	.022	.883	.895
25	7-320	.021875	.865	.8925	25	.02	.803	.813
26	3-160	.01875	.75	.765	26	.018	.722	.732
27	11-640	.0171875	.6875	.70125	27	.016	.642	.651
28	1-64	.015625	.625	.6375	28	.014	.562	.569
29	9-640	.0140625	.5625	.57375	29	.013	.....	.....
30	1-80	.0125	.5	.51	30	.012	.....	.....
31	7-640	.010985	.4375	.44625	31	.01	.....	.....
32	13-1280	.01045625	.40625	.414375	32	.009	.....	.....
33	3-320	.009375	.375	.3825	33	.008	.....	.....
34	11-1280	.00859375	.34375	.350625	34	.007	.....	.....
35	5-640	.0078125	.3125	.31875	35	.005	.....	.....
36	9-1280	.00703125	.28125	.286875	36	.004	.....	.....
37	17-2560	.00664062	.265625	.2709375	37	.....	.....	.....
38	1-160	.00625	.25	.255	.....	.....	.....	.....

Sheet mills roll iron and steel sheets to U. S. standard gauge unless otherwise ordered. Plate mills usually roll heavy plates $\frac{1}{4}$ and heavier, and light plates No. 8 to No. 12 to Birmingham gauge.

The low temperature (as compared with iron) at which steel plates have to be finished, causes a slight springing of the rolls, leaving the plate thicker in the center than on the edge. This is especially noticeable in plates less than $\frac{1}{4}$ inch thick and over 66 inches wide, which may be of full thickness on the edge and yet be as much as $\frac{1}{4}$ inch thicker in the middle.

MACHINE BOLTS.

With Square Heads and Square Nuts, Finished Points.

AVERAGE WEIGHT OF ONE HUNDRED.

Diam.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
Lgth. in In.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
1 1/2	3.75	6.12	9.3	14.7	20.2	26.0	36.5	58.0	.....	.....	.....	.....	.....	.....
1 3/4	4.04	6.61	10.1	15.6	21.5	27.4	38.6	60.9	.....	.....	.....	.....	.....	.....
2	4.33	7.10	10.9	16.6	22.8	29.0	40.8	63.9	88.5	142	.....	.....	.....	.....
2 1/4	4.62	7.59	11.7	17.5	24.0	30.6	42.9	66.9	93.2	147	.....	.....	.....	.....
2 1/2	4.91	8.08	12.5	18.4	25.3	32.2	45.0	69.9	98.0	152	.....	.....	.....	.....
2 3/4	5.20	8.57	13.3	19.3	26.6	33.8	47.2	72.8	102.7	157	.....	.....	.....	.....
3	5.50	9.06	14.1	20 3	27.9	35.4	49.3	75.8	107.5	162	200	289	350	480
3 1/2	6.21	10.14	15.5	22.4	30.4	38.7	53.6	81.7	117.0	172	213	305	370	500
4	6.92	11.22	16.9	24.4	32.9	42.0	57.9	87.7	126.5	182	226	322	390	520
4 1/2	7.63	12.30	18.3	26.5	35.4	45.3	62.2	93.6	136.0	192	240	339	410	545
5	8.35	13.38	19.7	28.5	37.9	48.6	66.4	99.6	145.5	202	255	356	430	570
5 1/2	9.06	14.46	21.1	30.6	40.4	51.9	70.7	105.5	155.0	212	270	373	450	595
6	9.77	15.54	22.5	32.6	42.9	55.2	75.0	111.5	164.5	222	285	390	470	620
6 1/2	10.48	16.62	23.9	34.7	45.4	58.5	79.3	117.5	173.0	232	300	407	490	645
7	11.19	17.70	25.3	36.7	47.9	61.8	83.4	123.6	181.0	243	315	434	510	670
7 1/2	11.90	18.78	26.7	38.8	50.4	65.1	87.6	129.6	189.0	253	330	451	530	695
8	12.62	19.87	28.1	40.8	52.9	68.5	91.8	135.6	197.0	264	345	468	550	725
9	.....	.....	30.9	44.9	57.9	75.2	100.2	147.6	213.0	285	375	505	590	775
10	.....	.....	33.8	49.0	62.9	81.9	108.7	159.7	229.0	306	405	540	630	825
11	.....	.....	36.6	53.1	67.9	88.7	117.1	171.7	245.0	327	435	575	670	875
12	.....	.....	39.4	57.2	72.9	95.5	125.6	183.7	261.0	348	465	610	710	925
13	.....	.....	.....	.....	77.9	102.3	134.0	195.8	277.0	369	495	645	751	975
14	.....	.....	.....	.....	82.9	109.1	142.4	207.8	293.0	391	525	680	793	1,025
15	.....	.....	.....	.....	87.9	116.0	150.9	219.8	309.0	413	555	715	835	1,075
16	.....	.....	.....	.....	92.9	123.0	159.3	231.8	325.0	435	585	750	877	1,125
17	.....	.....	.....	.....	97.9	130.0	167.7	243.9	341.0	457	615	785	919	1,175
18	.....	.....	.....	.....	102.9	137.0	176.1	255.9	357.0	479	645	810	961	1,225
19	.....	.....	.....	.....	107.9	144.0	184.6	267.9	373.0	501	675	845	1,003	1,275
20	.....	.....	.....	.....	112.9	151.0	193.0	280.0	389.0	523	705	880	1,045	1,325

COMMON CARRIAGE BOLTS.

AVERAGE WEIGHT OF 100

Length	1/4	5/16	3/8	7/16	1/2	5/8
1	2.8	4.8	6.9	9.4	14.5	28.0
1¼	3.1	5.2	7.6	10.4	15.9	30.0
1½	3.4	5.7	8.3	11.4	17.3	32.0
1¾	3.7	6.1	9.0	12.4	18.6	34.0
2	4.0	6.6	9.7	13.3	20.0	36.0
2¼	4.4	7.0	10.4	14.3	21.4	38.0
2½	4.7	7.5	11.1	15.3	22.8	40.0
2¾	5.0	7.9	11.8	16.3	24.2	42.0
3	5.3	8.4	12.5	17.3	25.5	44.0
3½	5.9	9.3	13.9	19.3	28.3	48.0
4	6.6	10.2	15.3	21.3	31.0	52.0
4½	7.2	11.1	16.7	23.3	33.8	56.0
5	7.8	12.0	18.0	25.3	36.5	60.0
5½	8.4	12.9	19.4	27.3	39.3	64.0
6	9.0	13.8	20.8	29.3	42.0	68.0
6½	9.7	14.7	21.2	31.2	44.8	72.0
7	10.3	15.6	23.6	33.2	47.5	76.0
7½	10.9	16.5	25.0	35.2	50.3	80.0
8	11.6	17.4	26.4	37.2	53.0	84.0
8½	....	18.4	27.8	39.2	55.8	88.0
9	....	19.3	29.2	41.2	58.5	92.0
9½	....	20.2	30.6	43.1	61.3	96.0
10	....	21.0	32.0	45.1	64.0	100.0
10½	....	....	33.4	47.1	66.8	104.0
11	....	....	34.8	49.1	69.5	108.0
11½	....	....	36.2	51.0	72.3	112.0
12	....	....	37.5	53.0	75.0	116.0

SQUARE HEAD LAG SCREWS.

AVERAGE WEIGHT OF 100.

Diam.	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1⅛	1¼	1½
Long	lbs	lbs	lbs	lbs	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1½	4.2	6.5	9.2	13.0	....	....	....	....	....	....	....	....
1¾	4.7	7.1	10.0	13.8	....	....	....	....	....	....	....	....
2	5.2	7.7	10.9	14.9	23.0	24.8	....	....	....	....	....	....
2¼	5.7	8.4	11.8	16.1	24.5	27.3	....	....	....	....	....	....
2½	6.2	9.2	12.7	17.4	26.0	29.0	43.0	....	....	....	....	....
3	7.2	10.6	14.6	19.0	29.2	32.9	48.3	75.0	....	....	....	....
3½	8.2	12.0	16.6	21.5	32.5	36.9	53.8	78.5	90	....	....	....
4	9.2	13.5	18.8	24.0	35.9	41.0	59.6	82.0	99	....	....	....
4½	10.2	15.0	20.7	26.5	39.3	44.9	65.5	86.0	108	....	....	....
5	11.3	16.5	22.8	29.0	42.7	48.8	71.5	90.0	118	150	....	....
5½	12.4	18.0	24.9	31.5	46.1	52.7	77.5	98.0	128	163	....	....
6	13.5	19.5	27.0	34.0	49.5	56.6	83.5	106.0	138	176	240	....
7	....	....	31.1	39.0	56.3	64.5	95.5	122.5	158	203	270	....
8	....	....	35.2	44.0	63.1	72.5	107.6	139.0	178	230	300	420
9	....	....	....	49.0	69.9	80.5	119.8	155.5	198	257	332	468
10	....	....	....	54.0	76.7	88.5	131.0	172.0	219	284	365	516
11	....	....	....	....	83.5	96.5	143.1	188.5	240	311	395	564
12	....	....	....	....	90.5	104.5	155.4	205.0	261	338	425	612

WEIGHT OF BLANK BOLTS PER 100.

SQUARE HEADS.

Diam.	5/16	7/16	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2
Length.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
3/4	5.6	8.7	11.2	....	....	....	....	....	....	....
1	6.4	9.7	12.6	23.0	....	....	....	....	....	....
1 1/4	7.2	10.7	14.0	24.9	39.5	....	....	....	....	....
1 1/2	8.0	11.7	15.4	27.1	42.5	63.0	....	....	....	....
1 3/4	8.8	12.7	16.8	29.0	45.5	67.0	90	....	....	....
2	9.6	13.7	18.2	31.0	48.8	71.0	95	....	....	....
2 1/4	10.4	14.7	19.6	33.0	51.5	75.2	100	141	....	....
2 1/2	11.2	15.7	21.0	35.0	54.5	79.4	105	149	....	....
2 3/4	12.0	16.7	22.4	37.0	57.5	83.7	110	157	....	....
3	12.8	17.7	23.8	39.0	60.5	88.0	115	165	215	370
3 1/2	14.4	19.7	26.6	43.5	66.5	96.3	125	180	232	392
4	16.0	21.7	29.4	48.0	72.7	104.5	136	195	249	414
4 1/2	17.5	23.7	31.2	52.5	78.9	112.8	147	210	266	437
5	19.0	25.7	35.0	56.5	85.1	121.8	158	225	283	461
5 1/2	20.5	27.7	37.8	60.5	91.3	129.3	169	240	300	485
6	22.0	29.7	40.6	64.6	97.5	137.5	180	265	317	510
7	25.0	33.7	46.0	72.8	109.0	154.0	202	290	351	560
8	28.0	37.7	51.5	81.0	121.0	171.0	223	315	386	610
9	....	41.7	56.7	89.0	133.0	188.0	245	340	420	660
10	....	45.7	62.0	97.0	145.0	205.0	267	365	453	710
11	....	....	67.5	105.0	157.0	222.0	288	390	488	760
12	....	....	73.0	114.0	170.0	239.0	310	415	523	810

WEIGHT OF BOLT ENDS PER 100.

SQUARE NUTS.

5/16 x 8	7 lbs.	5/8 x 12	120 lbs.	1 5/8 x 15	865 lbs.	2 x 20	2,400 lbs
3/4 x 8	12 "	3/4 x 12	172 "	1 1/2 x 16	1,075 "	2 1/4 x 22	3,150 "
7/8 x 8	18 "	7/8 x 12	255 "	1 5/8 x 17	1,350 "	2 1/2 x 24	4,200 "
1/2 x 10	34 "	1 x 12	342 "	1 3/4 x 18	1,670 "	2 3/4 x 24	5,100 "
7/16 x 10	42 "	1 1/8 x 13	445 "	1 7/8 x 19	1,900 "	3 x 26	6,400 "
1/2 x 12	74 "	1 1/4 x 14	644 "	.....	.....	.....	.....

SIZES OF HEADS FOR BOLTS.

Diameter Bolt	Square and Hexagon Heads — Width and Thickness	Button Heads and Carriage Bolt Heads — Width and Thickness	Tee Heads — Length, Width and Thickness	Square and Round Countersunk Heads — Width and Thickness
1/4	3/8 x 3/16	1/2 x 1/8	1/2 x 1/4 x 3/16	1/2 x 1/8
5/16	15/32 x 15/64	5/8 x 5/32	5/8 x 5/16 x 1/4	9/16 x 3/16
3/8	9/16 x 9/32	3/4 x 3/16	3/4 x 3/8 x 5/16	11/16 x 3/16
7/16	21/32 x 21/64	7/8 x 7/32	7/8 x 7/16 x 3/8	3/4 x 7/32
1/2	3/4 x 3/8	1 x 1/4	1 x 1/2 x 7/16	7/8 x 1/4
9/16	27/32 x 27/64	1 1/8 x 9/32	1 1/8 x 9/16 x 1/2	16/16 x 1/4
5/8	15/16 x 15/32	1 1/4 x 5/16	1 1/4 x 5/8 x 1 7/32	1 1/8 x 1/4
3/4	1 1/8 x 9/16	1 1/2 x 3/8	1 1/2 x 3/4 x 5/8	1 1/4 x 1/4
7/8	1 5/16 x 21/32	1 3/4 x 7/16	1 3/4 x 7/8 x 3/4	1 3/8 x 7/16
1	1 1/2 x 3/4	2 x 1/2	2 x 1 x 7/8	1 5/8 x 1/2
1 1/8	1 11/16 x 27/32	2 1/4 x 9/16	2 1/4 x 1 1/8 x 1	.....
1 1/4	1 7/8 x 15/16	2 1/2 x 5/8	2 1/2 x 1 1/4 x 1 1/4	.....
1 3/8	2 1/16 x 1 1/32	2 3/4 x 11/16	2 3/4 x 1 3/8 x 1 1/4	.....
1 1/2	2 1/4 x 1 1/2	3 x 3/4	3 x 1 1/2 x 1 3/8	.....
1 5/8	2 7/16 x 1 7/32	.....	.....	.....
1 3/4	2 5/8 x 1 5/16	.....	.....	.....
1 7/8	2 13/16 x 1 13/32	.....	.....	.....
2	3 x 1 1/2	.....	.....	.....

LENGTHS OF THREADS CUT ON BOLTS.

Length of Bolts	1/4 & 5/16	3/8	7/16 & 1/2	9/16 & 5/8	3/4	7/8	1	1 1/8	1 1/4
1 to 1 1/2 in.	3/4	3/4	1	1 1/4	..	..	..	..	..
1 5/8 " 2 "	3/4	3/4	1	1 1/4	1 1/2	1 1/2	..	..	..
2 1/8 " 2 1/2 "	3/4	3/4	1	1 1/4	1 1/2	1 3/4	1 3/4	..	..
2 5/8 " 3 "	7/8	7/8	1	1 1/4	1 1/2	1 3/4	1 3/4	2 1/4	..
3 1/8 " 4 "	7/8	7/8	1 1/4	1 1/2	1 1/2	1 3/4	1 3/4	2 1/4	2 1/2
4 1/8 " 8 "	1	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4
8 1/8 " 12 "	1	1	1 1/2	1 3/4	2	2 1/4	2 1/2	3	3
12 1/8 " 20 "	1	1	1 1/2	2	2	2 1/4	2 1/2	3	3

Bolts longer than 20 inches and larger than 1 1/4 inches in diameter will be threaded about 3 times the diameter of the rod.

LENGTHS OF THREADS ON LAG SCREWS.

OF ALL DIAMETERS.

Length of Bolt	Length of Thread	Length of Bolt	Length of Thread
1 1/2 inches	1 inches	5 inches	2 3/4 inches
2 "	1 1/4 "	5 1/2 "	3 "
2 1/2 "	1 1/2 "	6 "	3 1/4 "
3 "	1 3/4 "	7 "	3 1/2 "
3 1/2 "	2 "	8 "	4 1/4 "
4 "	2 1/4 "	9 "	4 1/2 "
4 1/2 "	2 1/2 "	10 to 12 "	5 "

WEIGHT OF NUTS.

AVERAGE NUMBER IN 100 POUNDS.

UNITED STATES STANDARD			MANUFACTURERS' STANDARD							
			SQUARE				HEXAGON			
Bolt	Square	Hexagon	Wide	Thick	Hole	Nuts	Wide	Thick	Hole	Nuts
1/4	7,200	8,400	1/2	1/4	7/32	4,000	1/2	1/4	7/32	4,790
5/16	4,300	5,100	5/8	5/16	9/32	2,380	5/8	5/16	9/32	2,510
3/8	2,550	3,000	3/4	3/8	11/32	1,460	3/4	3/8	11/32	1,580
7/16	1,770	2,030	7/8	7/16	25/64	1,230	7/8	7/16	25/64	1,440
1/2	1,180	1,400	1	1/2	7/16	930	1	1/2	7/16	1,090
9/16	915	1,065	1 1/8	9/16	1/2	700	1	9/16	1/2	980
5/8	655	780	1 1/8	5/8	9/16	620	1 1/8	9/16	1/2	800
11/16	380	470	1 1/4	5/8	9/16	475	1 1/8	5/8	9/16	660
3/4	385	475	1 1/4	3/4	21/32	400	1 1/4	3/4	9/16	588
7/8	260	308	1 3/8	3/4	21/32	345	1 1/4	5/8	9/16	541
1	172	212	1 1/2	3/4	21/32	270	1 1/4	3/4	9/16	460
1 1/8	130	150	1 1/2	7/8	25/32	240	1 1/4	3/4	21/32	485
1 1/4	96	111	1 5/8	7/8	25/32	205	1 3/8	3/4	21/32	394
1 3/8	70	85	1 3/4	7/8	25/32	183	1 3/8	7/8	21/32	347
1 1/2	59	69	1 3/4	1	7/8	156	1 1/2	3/4	21/32	310
1 5/8	46	54	2	1	7/8	115	1 1/2	7/8	21/32	266
1 3/4	35	41	2	1 1/8	31/32	106	1 1/2	7/8	25/32	283
1 7/8	29	35	2 1/4	1 1/8	31/32	81	1 1/2	1	25/32	230
2	24	29	2 1/4	1 1/4	1 3/32	70	1 5/8	7/8	25/32	235
2 1/8	20	25	2 1/2	1 1/4	1 3/32	57	1 5/8	1	25/32	210
2 1/4	17 1/2	21	2 3/4	1 3/8	1 3/16	44	1 3/4	1	7/8	186
2 3/8	15	19 1/2	3	1 1/2	1 5/16	35	1 3/4	1 1/8	7/8	168
2 1/2	12	15 1/2	3 1/4	1 3/8	1 7/16	25	2	1 1/4	31/32	110
2 5/8	11	14	3 1/2	1 3/4	1 11/16	20	2 1/4	1 3/8	1 3/32	79
2 3/4	9	11	3 3/4	1 7/8	1 11/16	16	2 1/2	1 1/2	1 3/16	59
3	7 1/3	8 1/2	4	2	1 13/16	12 3/4	2 3/4	1 5/8	1 5/16	45
3 1/4	6	7	.....	.....	.....	.....	3	1 3/4	1 7/16	33
3 1/2	5	5 3/4	.....	.....	.....	.....	3 1/4	1 7/8	1 5/16	27
3 3/4	4 1/3	4 5/6	.....	.....	.....	.....	3 1/2	2	1 11/16	21 1/2
4	3 1/3	4	.....	.....	.....	.....	3 1/2	2	1 13/16	22

PROPORTIONS FOR
U. S. STANDARD THREADS AND NUTS.

Short Diameter of Nuts	Long Diameter, Hexagon Nuts	Long Diameter, Square Nuts	Thickness of Nuts	Diameter of Screw	Threads per inch	Diameter at root of Thread	Area of Bolt at root of Thread
1/2	37/64	7/10	1/4	1/4	20	.185	.026
19/32	11/16	10/12	5/16	5/16	18	.240	.045
11/16	51/64	63/64	3/8	3/8	16	.294	.067
25/32	7/8	1 7/64	7/16	7/16	14	.344	.092
7/8	1	1 15/64	1/2	1/2	13	.400	.125
31/32	1 1/8	1 23/64	9/16	9/16	12	.454	.161
1 1/16	1 7/32	1 1/8	5/8	5/8	11	.507	.201
1 1/4	1 7/16	1 49/64	3/4	3/4	10	.620	.301
1 7/16	1 21/32	2 1/32	7/8	7/8	9	.731	.419
1 5/8	1 7/8	2 19/64	1	1	8	.837	.550
1 13/16	2 3/32	2 9/16	1 1/8	1 1/8	7	.940	.693
2	2 5/16	2 53/64	1 1/4	1 1/4	7	1.065	.890
2 3/16	2 17/32	3 3/32	1 3/8	1 3/8	6	1.160	1.056
2 3/8	2 3/4	3 23/64	1 1/2	1 1/2	6	1.284	1.294
2 9/16	2 31/32	3 5/8	1 5/8	1 5/8	5 1/2	1.389	1.515
2 3/4	3 3/16	3 57/64	1 3/4	1 3/4	5	1.491	1.746
2 15/16	3 13/32	4 5/32	1 7/8	1 7/8	5	1.616	2.051
3 1/8	3 5/8	4 27/64	2	2	4 1/2	1.712	2.301
3 1/2	4 1/16	4 61/64	2 1/4	2 1/4	4 1/2	1.962	3.023
3 7/8	4 1/2	5 31/64	2 1/2	2 1/2	4	2.176	3.718
4 1/4	4 29/32	6	2 3/4	2 3/4	4	2.426	4.622
4 5/8	5 3/8	6 17/32	3	3	3 1/2	2.629	5.428
5	5 13/16	7 1/16	3 1/4	3 1/4	3 1/2	2.879	6.509
5 3/8	6 7/64	7 39/64	3 1/2	3 1/2	3 1/4	3.100	7.547
5 3/4	6 21/32	8 1/8	3 3/4	3 3/4	3	3.318	8.641
6 1/8	7 3/32	8 41/64	4	4	3	3.567	9.993

ROPE TRANSMISSION.

Sag and Stretch of Rope. The sag and stretch of rope cannot be determined to any exact amount, as it varies with the load carried, the speed run, and the initial tension in the rope. In the multiple system, when slack comes on top, the rope is allowed to sag until parts running in opposite directions would nearly touch. It then has to be shortened The sag on tight side may be determined quite closely if the exact power to be carried is known. Likewise, in the continuous system, where it is possible to keep a uniform tension on rope, the sag may be closely approximated. In general, a rope should be allowed to run as slack as possible without slipping.

The sag of rope takes nearly the form of a parabola. The amount may be approximated by multiplying the weight of one foot of rope by the square of the distance from sheave to sheave where rope leaves, and dividing by eight times the tension on rope. For example, our two-inch diameter rope supported ninety feet apart, running at four thousand two hundred feet per minute $\frac{1.34 \text{ pounds} \times 8{,}100}{8 \times 800}$ equals 1.7 feet sag on driving side, which would be the same at all speeds The slack side sag may be determined after the same method, by adding to the intial tension the tension from centrifugal force. Thus, with the same rope as before—

$$\frac{1.34 \times 8100}{8 \times 199 \text{ pounds initial} + 205 \text{ centrifugal tension}} = 3.3 \text{ feet.}$$

A new rope will stretch considerably for a short time, but after the parts of rope are firmly bedded together, further stretch is slow. The total stretch should not exceed five per cent. under reasonable conditions. In cutting the slack out of continuous drives, it must be borne in mind to allow some movement of tightener sheave to guard against shrink caused by atmospheric conditions, and also to allow for future resplicing.

Amount of Tension on Continuous Systems. The amount of tension to be put on tightener of continuous system can only be approximated.

ROPE TRANSMISSION.

Data of Rope, Sag, Horse Power, etc.

Data of Rope.

Diameter of Rope. Inches.	Circumference of Rope, Inches	Approx. Weight per foot.	Approx. feet per pound.	Breaking Strength, pounds.	Maximum Tension.	Smallest Diameter Sheave, Inches.	Length to Allow for Splice, feet.	Tension Weight, pounds.	Square of Diameter.
3/4	2 1/4	.19	5.29	4200	112.5	30	7	88	.5625
7/8	2 5/8	.26	3.89	5700	153.12	35	8	114	.7656
1	3	.34	2.97	7500	200.	40	10	160	1.
1 1/4	3 3/4	.52	1.90	11700	312.5	50	10	248	1.5625
1 1/2	4 1/2	.76	1.32	16800	450.	60	12	360	2.25
1 3/4	5 1/4	1.03	.97	23000	612.5	70	12	490	3.0625
2	6	1.34	.74	30000	800.	80	14	640	4.

Circumference given is for 3-strand rope.

Weight is taken as .34 times the diameter^2 This is heavier than common rope on account of lubricant put in and extra compression given to fibres.

Breaking strength is taken as 7500 diameters^2. This is the average of larger sizes. Smaller sizes are even stronger.

Maximum tension is taken as 200 diameters^2.

Tension weight approximated only.

For splice in 3-strand rope, allow two-thirds that given in table; for 6-strand, one and one-half times as much.

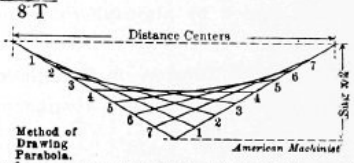
Sag of Rope in Feet.

Distance Centers in feet.	Sag in Driving Part, All Speeds.	Sag in Slack Part, at		
		3000 Feet per Minute.	4000 Feet per Minute.	5000 Feet per Minute.
30	.18	.44	.38	.32
40	.33	.79	.68	.58
50	.52	1.2	1.0	.91
60	.75	1.7	1.5	1.3
70	1.0	2.4	2.1	1.7
80	1.3	3.1	2.7	2.3
90	1.7	4.0	3.4	2.9
100	2.1	4.9	4.2	3.6
125	3.2	7.7	6.7	5.6
150	4.7	11.2	9.6	8.1

Sag takes nearly shape of parabola: $= \frac{W D^2}{8 T}$

Tension on rope $= \frac{W D^2}{8 S} + W S$

W=weight of one foot of rope. D=distance apart of centers. T=tension on rope. S=sag in feet.



Method of Drawing Parabola.

American Machinist

NOTE.—It is to be understood that sag given in table will only be correct when rope has its maximum tension of 200 diameters squared on driving side, and initial tension on slack side to support tight side in ratio of one to two.

ROPE TRANSMISSION.

Horse Power, Frictional Data of Groove, etc.

Horse Power.

Maximum Allowable Tension.	Approx. Weight, per foot.	Square of Diam.	Diam. of Rope.	Rope Speed, Feet per Minute.					
				1000	2000	3000	4000	5000	6000
112.5	.19	.5625	3/4	2.25	4.25	6.	7.	7.25	6.5
153.2	.26	.7656	7/8	3.	5.75	8.	9.5	10.	9.
200.	.34	1.	1	4.	7.5	10.5	12.5	12.75	11.5
312.5	.52	1.5625	1 1/4	6 25	11.75	16.5	19.5	20.	18.
450	.76	2.25	1 1/2	9.	17.	23.5	27.75	28.75	26.
612.5	1.03	3.0625	1 3/4	12.25	23.5	32.25	38.	39.25	35.25
800.	1.34	4.	2	16.	30.5	42.	49.5	51.25	46.
Rope Speed, ft. per sec.				16.6	33.3	50.	66.66	83.33	100.
Square of Speed, ft. per sec.				277.55	1110.88	2500.	4443.55	6943.88	10000.00
Square of speed, ft. per sec. ÷ 32				8.67	34.71	78.12	138.86	216.99	312.5

$$\text{Horse power} = \frac{L-F}{3} \times \frac{2V}{550}$$

L = Allowable Maximum Tension.

V = Speed of Rope, feet per sec.

$$F = \text{Tension from centrifugal force} = \frac{W\,V}{32}$$

W = Weight of one ft. of Rope.

This Table and Formula show the horse power which, under general conditions, is most economically transmitted with regard to Rope.

Frictional Data of Groove.

Angle of Groove.	A	Value of R when		
		f=.10	f=.12	f=.15
30°	3.86	.386	.463	.579
35°	3.33	.333	.399	.499
40°	2.92	.292	.350	.438
45°	2.62	.262	.314	.393
50°	2.36	.236	.283	.354
55°	2.16	.216	.259	.324
60°	2.00	.200	.240	.300
65°	1.86	.186	.223	.279

Data of Arc of Contact.

Arc of Contact in Degrees.	C	P	Ratio of Tensions between Tight and Slack Sides of Rope when		
			R=.2	R=.3	R=.4
150	2.62	.41	1.68	2.19	2.84
165	2.88	.45	1.77	2.37	3.16
180	3.15	.50	1.87	2.56	3.51
195	3.41	.54	1.97	2.77	3.90
210	3.67	.58	2.08	3.00	4.33
240	4.20	.66	2.31	3.51	5.34
270	4.72	.75	2.56	4.11	6.58

$$A = \text{Cosecant of } \frac{\text{Angle}}{2}$$

f = Coefficient of Friction of Rope on Metal.

R = Resistance to slipping of unity length = f A.

C = Circular Measure = Arc in degrees × .0175.

P = Part of Circumference.

EXAMPLE: Sheave has 45° grooves. Rope wraps around 180° f=.12. R=f A=.12 x 2.62=.314. Ratio when R=.3 with 180° contact=2.56. That is: It would take 2.56 pounds pull on driving side for every pound tension on rope on slack side to slip rope in groove under such conditions.

NOTES ON PULLEYS.

To Determine Sizes and Speeds of Pulleys.

1st.—To find what diameter of driving pulley should be to give driven pulley a certain speed, multiply the diameter of driven pulley by the number of revolutions it should make per minute, and divide this product by the number of revolutions per minute the driving pulley makes.

2nd.—To find diameter of driven pulley, multiply diameter of driving pulley by the number of revolutions it makes per minute, and divide this product by number of revolutions per minute driven pulley should make.

3rd.—To calculate speed of driving pulley, multiply diameter of driven pulley by number of revolutions per minute it makes, and divide this product by diameter of driving pulley.

4th.—To calculate speed of driven pulley, multiply diameter of driving pulley by number of revolutions it makes per minute, and divide this product by diameter of driven pulley.

The same rules can be applied to gearing by substituting for the diameters of pulleys, either the number of teeth of the gears or the diameters in inches.

The above rules are practically correct, although owing to the slip, elasticity and thickness of the belt, the circumference of the driven seldom runs as fast as the driver.

Examples.

A 30-inch pulley making 180 revolutions per minute, drives a countershaft with a 12-inch pulley. What is the speed of the latter?

$180 \times 30 \div 12 = 450$ revolutions per minute.

A countershaft is to make 450 revolutions per minute, driven by a 30-inch pulley making 180 revolutions per minute. What will be the diameter of countershaft pulley?

$180 \times 30 \div 450 = 12$ inches.

What will be the diameter of a pulley making 180 revolutions per minute, to drive a 12-inch pulley 450 per minute?

$450 \times 12 \div 180 = 30$-inch pulley.

To Determine the Horse Power of Pulleys.

Multiply the circumference of the pulley in feet by the number of revolutions it makes per minute, and this product by the width of the belt in inches. Divide this result by 600, which will give the horse-power the pulley will safely transmit.

Table Showing the Greatest Distance Advisable between the Bearings of Line Shafts.

Diameter of Shaft in inches.	2	3	4	5	6	7	8	9
Distance betwen Bearings in feet. Steel Shaft.	15.89	18.19	20.02	21.57	22.92	24.13	25.23	26

BELTING.

Ordinarily Accepted Equivalents.

2 Ply Rubber Belt=Light Single Leather Belt.
3 Ply Rubber Belt=Medium Single Leather Belt.
4 Ply Rubber Belt=Heavy Single Leather Belt.
5 Ply Rubber Belt=Light Double Leather Belt.
6 Ply Rubber Belt=Medium Double Leather Belt.
7 Ply Rubber Belt=Heavy Double Leather Belt.
8 Ply Rubber Belt=Triple Leather Belt.
Rubber Belt is often figured as averaging 1/16 inch thickness per ply.

HORSE POWER OF DETACHABLE LINK BELTING.

The following table gives the approximate horse-power transmitted by the different chains at 100 to 1,000 feet per minute, under average conditions. The estimates are conservatively made. Where resistance is uniform, and other conditions are favorable, it would be quite safe to figure on higher results. If, however, the chain be subjected to shocks, or there are other unfavorable conditions, proper allowance must be made.

Size.	Speed, in Feet Per Minute.									
	100	200	300	400	500	600	700	800	900	1000
25	.2	4	6	.8	1	1.2	1.35	1.5	1.65	1.75
32	.35	7	1	1 3	1.6	1.9	2.2	2.5	2.75	3
33	.4	.8	1 2	1.6	2	2.3	2.6	2.9	3.2	3.5
34 } 35 }	.45	.9	1.35	1.8	2.2	2.6	3	3.4	3.7	4
42	.5	1	1.5	2	2 5	2.9	3.3	3.7	4.1	4.5
45	.55	1.1	1.65	2 2	2.7	3.2	3.6	4	4.4	4.8
51	.5	1	1.5	2	2.5	2.9	3.3	3.7	4.1	4.5
52	.8	1.6	2.4	3.2	3.9	4.6	5.2	5.8	6.4	7
55	.75	1.5	2 25	3	3.75	4.4	5	5.5	6	6 5
57	1	2	3	4	4.7	5.4	6.1	6.8	7.4	8
62	1	2	3	4	4.7	5.4	6.1	6.8	7.4	8
66	1.2	2.4	3 6	4.8	5.8	6.7	7.6	8.3	8.9	9.5
67	1.3	2.6	3.9	5.2	6.3	7.3	8.2	9	9.8	10.5
75	1.4	2 8	4 2	5.6	6.7	7.7	8.7	9.6	10.5	11.4
77	1.5	3	4 5	6	7.25	8.5	9.5	10.5	11.25	12
78	1.75	3.5	5 25	7	8.5	9.75	11	12	13	14
88	2	4	6	8	9.75	11.25	12 75	14	15	16
103	3.5	7	10	12.5	15	17	19	20.5	22	23
114	4	8	12	15	17	19	21	23	25	27
124	4.5	9	13.5	17	20	22	24	26	28	30

When using gear wheels in connection with Link Belting and Sprocket wheels use

¾ inch pitch gears with Nos. 25 to 34
1 " " " " " 35 to 67
1½ " " " " " 71 to 88
2 " " " " " 103 to 160

HORSE POWER OF LEATHER BELTING.

Table of horse power transmitted by single leather belts, also four-ply rubber and four-ply cotton belts, to pulleys running one hundred revolutions per minute, the diameter of the driving and driven pulley being equal.

The horse-power of double leather, six-ply rubber or six-ply cotton belting is as 10 to 7 of that given in table.

Diameter of Pulley in Inches.	WIDTH OF BELT, IN INCHES.																
	2	3	4	5	6	8	10	12	14	16	18	20	22	24	26	28	30
	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.	H. P.
6	.44	.65	.87	1.09	1.31	....	....	....	....	....	....	....	....	....	....	....	....
7	.51	.76	1.01	1.27	1.53	....	....	....	....	....	....	....	....	....	....	....	....
8	.58	.87	1.16	1.45	1.75	....	....	....	....	....	....	....	....	....	....	....	....
9	.65	.98	1.31	1.64	1.97	....	....	....	....	....	....	....	....	....	....	....	....
10	.73	1.09	1.45	1.81	2.18	....	....	....	....	....	....	....	....	....	....	....	....
11	.8	1.2	1.6	2	2.4	....	....	....	....	....	....	....	....	....	....	....	....
12	.87	1.31	1.75	2.18	2.62	....	....	....	....	....	....	....	....	....	....	....	....
13	.95	1.42	1.89	2.36	2.83	....	....	....	....	....	....	....	....	....	....	....	....
14	1.02	1.52	2.02	2.53	3.05	....	....	....	....	....	....	....	....	....	....	....	....
15	1.09	1.64	2.19	2.73	3.29	....	....	....	....	....	....	....	....	....	....	....	....
16	1.16	1.74	2.32	2.91	3.48	....	....	....	....	....	....	....	....	....	....	....	....
17	1.24	1.85	2.47	3.09	3.7	....	....	....	....	....	....	....	....	....	....	....	....
18	1.31	1.96	2.62	3.27	3.92	....	....	....	....	....	....	....	....	....	....	....	....
19	1.39	2.07	2.76	3.45	4.14	....	....	....	....	....	....	....	....	....	....	....	....
20	1.45	2.18	2.91	3.64	4.36	....	....	....	....	....	....	....	....	....	....	....	....
21	1.52	2.29	3.05	3.82	4.58	....	....	....	....	....	....	....	....	....	....	....	....
22	1.6	2.4	3.2	4	4.8	....	....	....	....	....	....	....	....	....	....	....	....
23	1.67	2.51	3.35	4.18	5.02	....	....	....	....	....	....	....	....	....	....	....	....
24	....	....	3.5	4.4	5.2	7	8.7	10.5	12.2	14	16	17	19	21	23	24	26
25	....	....	3.6	4.5	5.5	7.3	9.1	10.9	12.7	14.5	....	....	....	....	....	....	....
26	....	....	3.8	4.7	5.7	7.6	9.5	11.3	13.2	15.1	....	....	....	....	....	....	....
27	....	....	3.9	4.9	5.9	7.8	9.8	11.8	13.7	15.6	....	....	....	....	....	....	....
28	....	....	4.1	5.1	6.1	8.1	10.2	12.2	14.3	16.3	....	....	....	....	....	....	....
29	....	....	4.2	5.3	6.3	8.4	10.5	12.6	14.8	16.9	....	....	....	....	....	....	....
30	....	....	4.4	5.4	6.6	8.7	10.9	13.1	15.3	17.4	19	22	24	26	28	31	33
31	....	....	4.5	5.6	6.8	9	11.3	13.5	15.8	18	....	....	....	....	....	....	....
32	....	....	4.7	5.8	7	9.3	11.6	14	16.3	18.6	....	....	....	....	....	....	....
33	....	....	4.8	6	7.2	9.6	12	14.4	16.8	19.2	....	....	....	....	....	....	....
34	....	....	4.9	6.2	7.4	9.9	12.4	14.8	17.3	19.8	....	....	....	....	....	....	....
35	....	....	5.1	6.4	7.6	10.2	12.7	15.3	17.9	20.4	....	....	....	....	....	....	....
36	....	....	5.2	6.5	7.8	10.5	13.1	15.7	18.3	20.9	24	26	29	31	34	37	39
37	....	....	5.4	6.7	8.1	10.8	13.5	16.2	18.9	21.5	....	....	....	....	....	....	....
38	....	....	5.5	6.9	8.3	11	13.8	16.6	19.3	22.1	25	28	30	32	36	39	41
39	....	....	5.7	7.1	8.5	11.3	14.2	17	19.9	22.7	....	....	....	....	....	....	....
40	....	....	5.8	7.3	8.7	11.6	14.6	17.5	20.4	23.3	26	29	32	35	38	41	44
42	....	....	6.1	7.6	9.2	12.2	15.3	18.2	21.4	24.3	28	31	34	36	40	43	46
44	....	....	6.4	8	9.6	12.8	16	19.2	22.4	25.6	29	32	35	38	42	45	48
46	....	....	6.7	8.4	10.	13.4	16	20.1	23.4	26.8	....	....	....	....	....	....	....
48	....	....	7	8.8	10.4	14	17.4	21	24.4	28	31	35	38	42	45	49	52
50	....	....	7.2	9	10.9	14.6	18.2	21.8	25.4	29	33	36	40	44	47	51	54
54	....	....	7.8	9.8	11.8	15.6	19.6	23.6	26.4	31.2	35	39	43	47	50	53	58
60	....	....	8.8	10.8	13.1	17.4	21.8	26.2	30.6	34.8	39	44	48	52	57	61	65
66	....	....	9.6	12	14.4	19.2	24.	28.8	33.6	38.4	43	48	53	58	62	67	72
72	....	....	10.4	13	15.6	21	26.2	31.4	36.6	41.8	47	52	58	63	68	73	78
78	....	....	11.4	14.2	17.	22.6	28.4	34	39.8	45.4	51	57	62	68	74	80	85
84	....	....	12.2	15.2	19.4	24.4	30.6	36.4	42.8	48.6	55	61	67	73	79	86	91

HORSE-POWER OF SHAFTING.

Number of Revolutions Per Minute.

Horse Power.	25	30	35	40	50	60	70	80	100	125	150	175	200	250	300
1	1 3/8	1 5/16	1 1/4	1 1/4	1 1/8	1 1/16	1	1 1/16	7/8	13/16	3/4	3/4	11/16	5/8	9/16
2	1 13/16	1 11/16	1 9/16	1 1/2	1 7/16	1 5/16	1 1/4	1 3/16	1 1/16	1 1/16	1	15/16	7/8	13/16	3/4
3	2	1 15/16	1 7/8	1 3/4	1 5/8	1 1/2	1 7/16	1 3/8	1 5/16	1 1/16	1 1/16	1 1/8	1 1/16	1	1
4	2 1/4	2 1/8	2	1 15/16	1 13/16	1 5/8	1 9/16	1 1/2	1 7/16	1 5/16	1 1/4	1 3/16	1 1/16	1 1/16	1 1/16
5	2 1/16	2 1/4	2 1/16	2 1/16	1 15/16	1 13/16	1 3/4	1 11/16	1 1/2	1 3/8	1 5/16	1 1/4	1 1/4	1 1/16	1 1/8
6	2 5/16	2 7/16	2 1/4	2 1/16	2	1 7/8	1 13/16	1 3/4	1 5/8	1 1/2	1 3/8	1 5/16	1 1/4	1 1/16	1 1/16
7	2 1/16	2 5/16	2 1/16	2 1/4	2 1/16	2	1 15/16	1 7/8	1 13/16	1 9/16	1 1/2	1 3/8	1 5/16	1 1/4	1 3/16
8	2 7/8	2 5/8	2 7/16	2 1/16	2 1/4	2 1/8	2	1 15/16	1 13/16	1 5/8	1 5/8	1 1/2	1 7/16	1 5/16	1 1/4
9	2 15/16	2 3/4	2 5/8	2 1/2	2 5/16	2 1/16	2 1/16	2	1 7/8	1 3/4	1 5/8	1 1/2	1 1/2	1 3/8	1 5/16
10	3 1/8	2 7/8	2 3/4	2 5/8	2 7/16	2 1/4	2 1/8	2 1/16	1 15/16	1 13/16	1 11/16	1 5/8	1 1/2	1 7/16	1 5/16
11	3 1/8	2 15/16	2 13/16	2 5/8	2 1/2	2 5/16	2 1/8	2 1/8	2	1 15/16	1 13/16	1 5/8	1 1/2	1 7/16	1 3/8
12	3 3/8	3 1/16	2 7/8	2 3/4	2 5/8	2 3/8	2 5/16	2 1/16	2 1/16	1 7/8	1 13/16	1 11/16	1 5/8	1 1/2	1 7/16
13	3 1/4	3 1/16	3	2 7/8	2 5/8	2 7/16	2 3/8	2 1/4	2 1/8	1 15/16	1 7/8	1 11/16	1 5/8	1 5/8	1 7/16
14	3 7/16	3 1/16	3 1/8	2 15/16	2 13/16	2 5/8	2 7/16	2 5/16	2 1/8	2	1 7/8	1 13/16	1 11/16	1 5/8	1 1/2
15	3 1/2	3 3/8	3 1/8	2 15/16	2 13/16	2 3/4	2 5/8	2 7/16	2 5/16	2 1/16	2 1/16	1 15/16	1 13/16	1 3/4	1 5/8
16	3 5/8	3 3/8	3 3/16	3 1/8	2 15/16	2 13/16	2 5/8	2 7/16	2 3/8	2 1/4	2 1/8	1 15/16	1 7/8	1 13/16	1 5/8
17	3 5/8	3 7/8	3 7/16	3 1/16	2 7/8	2 13/16	2 7/16	2 7/16	2 5/16	2 1/16	2 1/8	2	1 7/8	1 13/16	1 5/8
18	3 11/16	3 1/2	3 5/16	3 1/8	3 1/16	2 13/16	2 3/4	2 5/8	2 5/16	2 1/8	2 1/16	1 15/16	1 7/8	1 7/8	1 3/4
19	3 13/16	3 5/8	3 3/8	3 1/4	3 1/16	2 15/16	2 13/16	2 5/8	2 7/16	2 1/4	2 1/8	2	1 15/16	1 13/16	1 3/4
20	3 13/16	3 5/8	3 3/8	3 1/4	3 1/16	2 15/16	2 13/16	2 5/8	2 7/16	2 1/4	2 1/8	2	1 15/16	1 13/16	1 3/4
25	4 1/16	3 13/16	3 5/8	3 1/2	3 5/16	3 1/16	2 15/16	2 7/8	2 5/8	2 7/16	2 5/16	2 1/16	2 1/8	2 1/16	1 15/16
30	4 7/16	4 1/16	3 15/16	3 3/4	3 1/2	3 5/16	3 1/4	3 1/16	3	2 7/8	2 7/8	2 5/8	2 7/16	2 1/16	2 1/16
35	4 9/16	4 1/8	4 1/8	3 15/16	3 5/8	3 7/16	3 5/16	3 3/16	3 1/16	2 15/16	2 13/16	2 5/8	2 7/16	2 5/16	2 1/8
40	5 1/16	4 5/8	4 1/4	4 1/8	3 7/8	3 11/16	3 9/16	3 7/16	3 5/16	3 1/16	2 15/16	2 13/16	2 5/8	2 7/16	2 1/4
45	5 3/16	4 7/8	4 1/2	4 1/4	4 1/16	3 13/16	3 11/16	3 9/16	3 7/16	3 1/4	3 1/16	2 15/16	2 13/16	2 5/8	2 1/2
50	5 1/4	4 15/16	4 5/8	4 7/16	4 1/8	3 15/16	3 13/16	3 5/8	3 7/16	3 1/8	3 1/8	2 15/16	2 13/16	2 5/8	2 1/2
55	5 3/8	5 1/16	4 7/8	4 5/8	4 1/4	4	3 13/16	3 11/16	3 5/8	3 7/16	3	2 7/8	2 13/16	2 1/2	2 3/8
60	5 5/8	5 1/4	4 15/16	4 3/4	4 3/8	4 1/8	3 15/16	3 13/16	3 5/8	3 1/4	3 1/16	2 15/16	2 13/16	2 5/8	2 1/2
70	5 3/4	5 1/2	5 1/4	5	4 11/16	4 3/8	4 1/4	4 1/16	3 15/16	3 5/8	3 7/16	3 3/8	3 1/8	2 7/8	2 13/16
80	6 1/16	5 3/4	5 1/2	5 1/4	4 15/16	4 1/2	4 3/8	4 1/16	3 15/16	3 13/16	3 5/8	3 7/16	3 1/4	3 1/8	2 7/8
90	6 1/4	6	5 5/8	5 7/16	5 1/8	4 3/4	4 1/2	4 1/4	4	3 3/4	3 5/8	3 7/16	3 5/16	3 1/16	2 15/16
100	6 1/16	6 1/4	5 3/4	5 5/8	5 3/16	4 15/16	4 5/8	4 1/16	4 1/4	3 7/8	3 13/16	3 5/8	3 3/8	3 1/4	3 1/8
120	6 15/16	6 3/4	6 1/4	6	5 11/16	5 1/4	5	4 7/8	4 7/16	4 1/8	3 15/16	3 13/16	3 5/8	3 1/2	3 3/4
140	7 1/2	6 15/16	6 3/4	6 3/8	5 15/16	5 1/2	5 3/16	5	4 5/8	4 1/4	4	3 13/16	3 11/16	3 7/16	3 1/4
160	7 5/8	7 1/4	6 15/16	6 3/4	6 1/16	5 3/4	5 7/16	5 1/4	4 15/16	4 1/16	4 1/4	4	3 13/16	3 5/8	3 7/16
180	8	7 1/2	7 1/4	6 7/8	6 1/4	5 13/16	5 3/4	5 7/16	5 1/16	4 3/4	4 1/2	4 1/4	4	3 3/4	3 1/2
200	8 1/4	7 13/16	7 5/8	7 1/16	6 1/16	6 1/8	5 7/8	5 3/4	5 5/16	4 15/16	4 5/8	4 1/2	4 1/4	4	3 7/8
250	9	8 1/2	8	7 1/2	7 1/16	6 13/16	6 3/8	6 1/16	5 3/4	5 1/4	5	4 5/8	4 7/16	4 1/8	4 1/8
300	9 1/8	9	8 5/8	8 1/4	7 1/2	7 1/16	6 7/8	6 7/16	6	5 1/2	5 1/4	5	4 3/4	4 7/16	4 1/8
350	10	9 3/8	9	8 1/2	7 15/16	7 7/16	7 1/16	6 7/8	6 7/16	5 3/4	5 7/16	5 1/16	5	4 5/8	4 3/8
400	10 1/2	9 7/8	9 7/16	9	8 3/8	7 7/8	7 3/8	7 1/16	6 3/4	6 1/8	5 3/4	5 7/16	5 1/4	4 7/8	4 1/2
450	10 3/4	10 1/8	9 13/16	9 1/4	8 3/4	8 1/16	7 7/16	7 3/8	6 13/16	6 1/4	6	5 3/4	5 3/8	5 1/16	4 5/8
500	11 1/16	10 1/2	10	9 5/8	9	8 3/8	8	7 1/2	7 1/8	6 3/4	6 3/16	6	5 3/4	5 1/16	4 7/8
550	11 1/2	10 7/8	10 3/8	10	9 1/4	8 7/8	8 1/2	8	7 5/8	6 3/4	6 1/4	6	5 3/4	5 3/8	5
600	11 7/8	11 3/4	10 5/8	10 1/4	9 1/2	8 15/16	8 1/2	8 1/8	7 3/4	7 1/8	6 3/4	6 1/4	5 13/16	5 5/16	5 1/4

Diametral Pitch

With Its Equivalent In Circular Pitch.

Diametral Pitch.	Circular Pitch.	Diametral Pitch.	Circular Pitch.	Diametral Pitch.	Circular Pitch.
½	6.2832	4	.7854	20	.1571
¾	4.1888	5	.6283	22	.1428
1	3.1416	6	.5236	24	.1309
1¼	2.5133	7	.4488	26	.1208
1½	2.0944	8	.3927	28	.1122
1¾	1.7952	9	.3491	30	.1047
2	1.5708	10	.3142	32	.0982
2¼	1.3963	11	.2856	36	.0873
2½	1.2566	12	.2618	40	.0785
2¾	1.1424	14	.2244	48	.0654
3	1.0472	16	.1963		
3½	.8976	18	.1745		

Horse Power of Gears.

Cast Iron.

F = Breadth, or Face, of Tooth in inches.
T = Thickness of Tooth at pitch line, inches.
V = Velocity at pitch line in feet per minute.
L = Length of Tooth, from root to point, in inches.
C = Co-efficient.
H P = Horse Power transmitted with a safety of eight; ultimate tensile strength 30,000 lbs per square inch.

FORMULÆ.

(1) Horse power of Spur Gears $= \frac{F \times T^2 \times V}{L \times 53}$

(2) Horse power of Bevel Gears $= \frac{F \times T^2 \times V}{L \times 77}$

(3) Horse power of Miter Gears $= \frac{F \times T^2 \times V}{L \times 82}$

In formulæ for Bevel and Miter Gears the factors T and L express the pitch at large end of tooth.

For Bevel and Miters, thickness and length of teeth have been computed at center of face. With a view, however, of facilitating calculation, the proportions of factors T and L in formulæ (2) and (3) have been taken at large end of tooth, thus giving same dimensions as for Spur Gears; hence the Spur Gear formula has been utilized, with the exception of *co-efficient*, which has been determined by *averaging* the proportions of the teeth of Bevel and Miter Gears having the largest and smallest number of teeth in our general trade. The resultant horse power is consequently less than in case of Spur Gears of like pitch.

For Mortise Wheels and Pinions use thickness of pinion tooth. If different margin of safety is desired, multiply above result by 8 and divide by factor of safety desired. 2200 ft. per min. at pitch line for iron gearing, and 3000 ft. for wood and iron, are excessive velocities. and should be avoided if possible

WROUGHT-IRON WELDED PIPE.

Dimensions, Weights, etc., of Standard Sizes for Steam, Gas, Water, Oil, etc.

One and one-quarter inch and below are butt-welded and proved to 300 pounds per square inch hydraulic pressure.

One and one-half inch and above are lap-welded and proved to 500 pounds per square inch hydraulic pressure.

Diameter, inches.	Outside Diameter, inches.	External Circumference, inches.	Length of Pipe per square foot, Outside Surface, feet.	Internal Area, inches.	External Area, inches.	Length of Pipe containing one cubic foot of Surface, feet.	Weight per foot of Length, pounds.	No. of Threads per inch of Screw.	Contents in *Gallons, per foot.	Weight of Water per foot of Length, pounds.
1/8	.40	1.272	9.440	.057	.129	2500.00	.24	27	.0006	.005
1/4	.54	1.696	7.075	.104	.229	1385.00	.42	18	.0026	.021
3/8	.67	2.120	5.657	.191	.358	751.50	.56	18	.0057	.047
1/2	.84	2.652	4.502	.304	.554	472.40	.84	14	.0102	.085
3/4	1.05	3.299	3.637	.533	.866	270.00	1.12	14	.0230	.190
1	1.31	4.134	2.903	.862	1.357	166.90	1.67	11½	.0408	.349
1¼	1.66	5.215	2.301	1.496	2.164	96.28	2.25	11½	.0638	.527
1½	1.90	5.969	2.010	2.038	2.835	70.65	2.69	11½	.0918	.760
2	2.37	7.461	1.611	3.355	4.430	42.36	3.66	11½	.1632	1.356
2½	2.87	9.032	1.328	4.783	6.491	30.11	5.77	8	.2550	2.116
3	3.50	10.996	1.091	7.388	9.621	19.49	7.54	8	.3673	3.049
3½	4.00	12.566	.955	9.837	12.566	14.56	9.05	8	.4998	4.165
4	4.50	14.137	.849	12.730	15.904	11.31	10.72	8	.6528	5.405
4½	5.00	15.708	.756	15.939	19.635	9.03	12.49	8	.8263	6.851
5	5.56	17.475	.629	19.990	24.299	7.20	14.56	8	1.0200	8.500
6	6.62	20.813	.577	28.889	34.471	4.98	18.76	8	1.4690	12.312
7	7.62	23.954	.505	38.737	45.663	3.72	23.41	8	1.9990	16.662
8	8.62	27.096	.444	50.039	58.426	2.88	28.34	8	2.6110	21.750
9	9.68	30.433	.394	63.633	73.715	2.26	34.67	8	3.3000	27.500
10	10.75	33.772	.355	78.838	90.792	1.80	40.64	8	4.0810	34.000

*The United States Standard Gallon of 231 cubic inches.

TABLE FOR EQUALIZING PIPES.

The size of main pipe is given in the column at the left. The number of branches is given in the line on top, and the proper size of branches is given in the body of the table on the line of each main and beneath the desired number of branches.

In commercial sizes the nominal 1¼ inch pipe is generally over size. Often as large as 1⅜. It is safe to call it 1.3 inches, and it is so figured in the table. Exact sizes are given for branch pipes. The designer of the pipe system can thus better select the commercial sizes to be used.

Size of Main Pipe, inches.	Number of Branches.							
	2	3	4	5	6	7	8	9
1	.758	.644	.574	.525	.488	.459	.435	.415
1¼	.985	.838	.747	.683	.635	.597	.556	.540
1½	1.14	.967	.861	.788	.733	.689	.653	.623
2	1.52	1.29	1.15	1.05	.977	.918	.870	.830
2½	1.89	1.61	1.44	1.31	1.22	1.15	1.09	1.09
3	2.27	1.92	1.72	1.58	1.47	1.38	1.31	1.25
3½	2.65	2.26	2.01	1.84	1.71	1.61	1.52	1.45
4	3.03	2.58	2.30	2.10	1.95	1.84	1.74	1.66
4½	3.41	2.90	2.58	2.36	2.20	2.07	1.96	1.87
5	3.79	3.22	2.87	2.63	2.44	2.30	2.18	2.08
6	4.55	3.87	3.45	3.15	2.93	2.75	2.61	2.49
7	5.30	4.51	4.02	3.68	3.42	3.21	3.05	2.91
8	6.06	5.16	4.59	4.20	3.91	3.67	3.48	3.32
9	6.82	5.80	5.17	4.73	4.40	4.13	3.92	3.74
10	7.58	6.44	5.74	5.25	4.88	4.59	4.35	4.15
12	9.08	7.73	6.89	6.30	5.86	5.51	5.22	4.98

Size of Main Pipe, inches.	Number of Branches.						
	10	11	12	13	14	15	16
1	.398	.383	.370	.358	.348	.338	.330
1¼	.518	.498	.482	.466	.452	.440	.428
1½	.697	.575	.555	.538	.522	.508	.494
2	.796	.766	.740	.717	.696	.677	.660
2½	.995	.958	.925	.896	.870	.846	.825
3	1.19	1.15	1.11	1.08	1.04	1.02	.989
3½	1.39	1.34	1.30	1.25	1.22	1.18	1.15
4	1.59	1.53	1.48	1.43	1.39	1.35	1.32
4½	1.79	1.72	1.67	1.61	1.57	1.52	1.48
5	1.99	1.92	1.85	1.79	1.74	1.69	1.65
6	2.39	2.30	2.22	2.15	2.09	2.03	1.98
7	2.79	2.68	2.59	2.51	2.44	2.37	2.31
8	3.18	3.09	2.96	2.87	2.78	2.71	2.64
9	3.58	3.45	3.33	3.23	3.13	3.04	2.97
10	3.98	3.83	3.70	3.59	3.48	3.38	3.30
12	4.78	4.60	4.44	4.30	4.18	4.06	3.96

GALLONS DISCHARGED PER HOUR THROUGH VARIOUS SIZED ORIFICES UNDER STATED PRESSURES.

Head in feet.	Pounds Pressure per square inch.	Diameters of Orifices in Inches and Fractions of an Inch.									
		¼ inch.	⅜ inch.	½ inch.	⅝ inch.	¾ inch.	1 inch.	1¼ inch.	1½ inch.	1¾ inch.	2 inch.
20	8.66	300	720	1260	1920	2760	4920	7380	11100	15120	19740
40	17.32	450	960	1800	2760	3960	6720	10920	15720	21360	27960
60	25.99	540	1200	2160	3480	4800	8580	13380	19200	26220	34260
80	34.65	620	1380	2460	3840	5580	9840	15480	22260	30300	39540
100	43.31	690	1560	2760	4320	6240	11040	17280	24900	33900	44280
120	51.98	780	1680	3000	4740	6840	12120	18960	27240	37440	48480
140	60.64	816	1860	3300	5100	7320	13020	20160	29460	39080	52320
150	64.97	840	1920	3420	5280	7620	13560	21180	30480	41460	54120
175	75.80	900	2040	3660	5700	8220	14640	22800	32880	44940	58560
200	86.63	960	2220	3900	6120	8760	15600	25020	35880	47880	62580
235	101.79	1080	2460	4320	8280	11160	17100	26760	38520	52260	68460

The pressure or head of water is taken at the orifice, no allowance being made for friction in the pipe. In practical calculations to determine the height which water can be thrown, the head consumed by the friction of the water in flowing from the source to the orifice must be considered.

MISCELLANEOUS.

Power.—The units of force, distance and time are, respectively, 1 pound, 1 foot, and 1 minute.

Man Power.—One man's power=.0909 horse power=3,000 units of work=3,000 lbs. raised vertically 1 foot in 1 minute, or its equivalent.

Horse Power.—One horse power=11 men's power=33,000 units of work=33,000 lbs. raised vertically 1 foot in 1 minute, or its equivalent.

Atmospheric Weight.—In whole numbers the atmospheric pressure per square inch is 15 lbs.

Atmospheric Air.—A column, 1 inch square, full height=14.73 lbs.

Mercury.—A column, 1 inch square, and 30 inches high=14.73 "

Fresh Water.—A column, 1 inch square, and 33.95 feet high=14.73 lbs.

Salt Water.—A column, 1 inch square, and 33.05 feet high=14.73 lbs.

CAST-IRON PIPE.

Safe thickness of metal and weight per length, including bells, for different sizes and under various heads of water

Size Inside Diameter.	25 ft. Head or 10.82 lbs. Pressure.		50 ft. Head or 21.65 lbs. Pressure.		100 ft. Head or 43.30 lbs. Pressure.		150 ft. Head or 64.85 lbs. Pressure.		200 ft. Head or 86.60 lbs. Pressure.		250 ft. Head or 108.25 lbs Pressure.		300 ft. Head or 129.90 lbs. Pressure.		Contents in gallons for 1 foot in length.
	Thickness of Metal.	Weight per Length.	Thickness of Metal.	Weight per Length.	Thickness of Metal.	Weight per Length.	Thickness of Metal.	Weight per Length.	Thickness of Metal.	Weight per Length.	Thickness of Metal.	Weight per Length.	Thickness of Metal.	Weight per Length.	
	In.	Lbs.	In.	Lbs.	In.	Lbs.	In.	Lbs.	In.	Lbs.	In.	Lbs.	In.	Lbs.	
2	.255	54	.294	63	.312	67½	.330	72	.348	76½	.366	81	.384	86	.163
3	.320	132	.344	144	.353	149	.362	153	.371	157	.380	161	.390	166	.367
4	.335	180	.361	197	.373	204	.385	211	.397	218	.409	226	.421	235	.652
6	.375	300	.393	315	.411	330	.429	345	.447	361	.465	377	.483	393	1.469
8	.433	456	.422	445	.450	475	.474	502	.498	529	.522	557	.546	584	2.611
10	.442	576	.459	600	.489	641	.519	682	.549	723	.579	766	.609	808	4.081
12	.446	720	.491	768	.527	826	.563	885	.599	944	.635	1004	.671	1064	5.876
14	.....	.....	.524	952	.566	1031	.608	1111	.650	1191	.692	1272	.734	1352	7.997
16	.....	.....	.580	1215	.604	1253	.652	1360	.700	1463	.748	1568	.796	1673	10.440
18	.....	.....	.589	1370	.643	1500	.697	1630	.751	1761	.805	1894	.859	2026	13.220
20	.....	.....	.622	1603	.682	1763	.742	1924	.802	2086	.862	2248	.922	2412	16.320
24	.....	.....	.687	2120	.759	2349	.831	2580	.903	2811	.975	3045	1.047	3278	23.500
30	.....	.....	.785	3020	.875	3376	.965	3735	1.055	4095	1.145	4458	1.235	4822	36.720
36	.....	.....	.882	4070	.990	4581	1.098	5096	1.206	5613	1.311	6133	1.422	6656	52.880
48	.....	.....	1.078	6616	1.222	7521	1.366	8431	1.510	9340	1.654	10269	1.798	11195	94.020

All pipes cast in lengths of 12 feet, except the 2-inch, which are cast 9 feet long.

Pipes with flanges weigh about 15 per cent more than above.

Packing of rubber for flanged pipe is usually ⅛ inch thick and weighs about 10 lbs. to the square yard.

TEMPERING STEEL.

Steel in its hardest state being too brittle for most purposes, the requisite strength and elasticity are obtained by tempering—or letting down the temper, as it is termed—which is performed by heating the hardened steel to a certain degree and cooling it quickly. The requisite heat is usually ascertained by the color which the surface of the steel assumes from the film of oxide thus formed. The degrees of heat to which the several colors correspond are as follows:

At 430, a very faint yellow. At 450, a pale straw color. Suitable for hard instruments; as hammer faces, drills, etc.

At 470, a full yellow. At 490, a brown color. For instruments requiring hard edges without elasticity; as shears, scissors, turning tools, etc.

At 510, brown, with purple spots. At 538, purple. For tools for cutting wood and soft metals; such as plane irons, knives, etc.

At 550, dark blue. At 560, full blue. For tools requiring strong edges without extreme hardness; as cold chisels, axes, cutlery, etc.

At 600, grayish blue, verging on black. For spring temper, which will bend before breaking; as saws, sword blades, etc.

If the steel is heated higher than this, the effect of the hardening process is destroyed.

NUMBER OF U. S. GALLONS IN GIVEN NUMBER OF CUBIC FEET.

Cubic Feet.	Gallons.	Cubic Feet.	Gallons.	Cubic Feet.	Gallons.
0.1	0.75	50	374.0	9,000	67,324.6
0.2	1.50	60	448.8	10,000	74,805.2
0.3	2.24	70	523.6	20,000	149,610.4
0.4	2.99	80	598.4	30,000	224,415.6
0.5	3.74	90	673.2	40,000	299,220.7
0.6	4.49	100	748.0	50,000	374,025.9
0.7	5.24	200	1,496.1	60,000	448,831.1
0.8	5.98	300	2,244.1	70,000	523,636.3
0.9	6.73	400	2,992.2	80,000	598,441.5
1	7.48	500	3,740.2	90,000	673,246.7
2	14.9	600	4,488.3	100,000	748,051.9
3	22.4	700	5,236.3	200,000	1,496,103.8
4	29.9	800	5,984.4	300,000	2,244,155.7
5	37.4	900	6,732.4	400,000	2,992,207.6
6	44.9	1,000	7,480.0	500,000	3,740,259.5
7	52.4	2,000	14,961.0	600,000	4,488,311.4
8	59.8	3,000	22,441.5	700,000	5,236,363.3
9	67.3	4,000	29,922.0	800,000	5,984,415.2
10	74.8	5,000	37,402.6	900,000	6,732,467.1
20	149.6	6,000	44,883.1	1,000,000	7,480,519.0
30	224.4	7,000	52,363.6	.....	.....
40	299.2	8,000	59,844.1	.....	.....

Rate of Flow of Water, in Feet per Minute, Through Pipes of Various Sizes, for Varying Quantities of Flow.

Gallons per minute.	¾″	1″	1¼″	1½″	2″	2½″	3″	4″
5	218	122½	78½	54½	30½	19½	13½	7⅔
10	436	245	157	109	61	38	27	15⅓
15	653	367½	235½	163½	91½	58½	40½	23
20	872	490	314	218	122	78	54	30⅔
25	1090	612½	392½	272½	152½	97½	67½	38⅓
30	.....	735	451	327	183	117	81	46
35	.....	857½	549½	381½	213½	136½	94½	53⅔
40	.....	980	628	436	244	156	108	61⅓
45	.....	1102½	706½	490½	274½	175½	121½	69
50	.....	.....	785	545	305	195	135	76⅔
75	.....	.....	1177½	817½	457½	292½	202½	115
100	.....	.....	.....	1090	610	380	270	153⅓
125	.....	.....	.....	.....	762½	487½	337½	191⅔
150	.....	.....	.....	.....	915	585	405	230
175	.....	.....	.....	.....	1067½	682½	472½	268⅓
200	.....	.....	.....	.....	1220	780	540	306⅔

LOSS BY FRICTION OF WATER IN PIPES.

Friction loss in pounds pressure per square inch for each 100 feet in length of different sizes clean iron pipes, when discharging the given quantities of water per minute.

Gals. per minute.	SIZES OF PIPES—INSIDE DIAMETER.														
	¾ in.	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	3 in.	4 in.	6 in.	8 in.	10 in.	12 in.	14 in.	16 in.	18 in.
5	3.3	0.84	0.31	0.12	....	....	....	....	....	....	....	....	....	....	....
10	13.0	3.16	1.05	0.47	0.12	....	....	....	....	....	....	....	....	....	....
15	28.7	6.98	2.38	0.97	....	....	....	....	....	....	....	....	....	....	....
20	50.4	12.3	4.07	1.66	0.42	....	....	....	....	....	....	....	....	....	....
25	78.0	19.0	6.40	2.62	....	0.21	0.10	....	....	....	....	....	....	....	....
30	....	27.5	9.15	3.75	0.91	....	....	....	....	....	....	....	....	....	....
35	....	37.0	12.4	5.05	....	....	....	....	....	....	....	....	....	....	....
40	....	48.0	16.1	6.52	1.60	....	....	....	....	....	....	....	....	....	....
45	....	....	20.2	8.15	....	....	....	....	....	....	....	....	....	....	....
50	....	....	24.9	10.0	2.44	0.81	0.35	0.09	....	....	....	....	....	....	....
75	....	....	56.1	22.4	5.32	1.80	0.74	....	....	....	....	....	....	....	....
100	....	....	....	39.0	9.46	3.20	1.31	0.33	0.05	....	....	....	....	....	....
125	....	....	....	....	14.9	4.89	1.99	....	....	....	....	....	....	....	....
150	....	....	....	....	21.2	7.0	2.85	0.69	0.10	....	....	....	....	....	....
175	....	....	....	....	28.1	9.46	3.85	....	....	....	....	....	....	....	....
200	....	....	....	....	37.5	12.47	5.02	1.22	0.17	....	....	....	....	....	....
250	....	....	....	....	....	19.66	7.76	1.89	0.26	0.07	0.03	0.01	....	....	....
300	....	....	....	....	....	28.06	11.2	2.66	0.37	0.09	0.04	....	....	....	....
350	....	....	....	....	....	....	15.2	3.65	0.50	0.12	0.05	0.02	....	....	....
400	....	....	....	....	....	....	19.5	4.73	0.65	0.16	0.06	....	....	....	....
450	....	....	....	....	....	....	25.0	6.01	0.81	0.20	0.07	0.03	....	....	....
500	....	....	....	....	....	....	30.8	7.43	0.96	0.25	0.09	0.04	0.017	0.009	0.005
750	....	....	....	....	....	....	....	....	2.21	0.53	0.18	0.08	....	....	....
1000	....	....	....	....	....	....	....	....	3.88	0.94	0.32	0.13	0.062	0.036	0.020
1250	....	....	....	....	....	....	....	....	....	1.46	0.49	0.20	....	....	....
1500	....	....	....	....	....	....	....	....	....	2.09	0.70	0.29	0.135	0.071	0.040
1750	....	....	....	....	....	....	....	....	....	....	0.95	0.38	....	....	....
2000	....	....	....	....	....	....	....	....	....	....	1.23	0.49	0.234	0.123	0.071
2250	....	....	....	....	....	....	....	....	....	....	....	0.63	....	....	....
2500	....	....	....	....	....	....	....	....	....	....	....	0.77	0.362	0.188	0.107
3000	....	....	....	....	....	....	....	....	....	....	....	1.11	0.515	0.267	0.150
3500	....	....	....	....	....	....	....	....	....	....	....	....	0.697	0.365	0.204
4000	....	....	....	....	....	....	....	....	....	....	....	....	0.910	0.472	0.263
4500	....	....	....	....	....	....	....	....	....	....	....	....	....	0.593	0.333
5000	....	....	....	....	....	....	....	....	....	....	....	....	....	0.730	0.408

NUMBER OF U. S. GALLONS IN ROUND TANKS.

For One Foot in Depth.

Dia. of Tanks.	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.
1 ft.	5.87	.785
1 " 1 In.	6.89	.922
1 " 2 "	8.	1.069
1 " 3 "	9 18	1 227
1 " 4 "	10 44	1.396
1 " 5 "	11 79	1.576
1 " 6 "	13.22	1.767
1 " 7 "	14 73	1.969
1 " 8 "	16 32	2 182
1 " 9 "	17 99	2.405
1 " 10 "	19 75	2 640
1 " 11 "	21 58	2 885
2 "	23 50	3 142
2 " 1 "	25 50	3.409
2 " 2 "	27 58	3 687
2 " 3 "	29 74	3.976
2 " 4 "	31 99	4 276
2 " 5 "	34.31	4 587
2 " 6 "	36 72	4 909
2 " 7 "	39 21	5 241
2 " 8 "	41 78	5 585
2 " 9 "	44 43	5 940
2 " 10 "	47 16	6 305
2 " 11 "	49 98	6 681
3 "	52 88	7 069
3 " 1 "	55.86	7 467
3 " 2 "	58 92	7.876
3 " 3 "	62.06	8.296
3 " 4 "	65.28	8.727
3 " 5 "	68.58	9 168
3 " 6 "	71 97	9 621
3 " 7 "	75.44	10 085
3 " 8 "	78.99	10 559
3 " 9 "	82.62	11 045
3 " 10 "	86.33	11 541
3 " 11 "	90.18	12 048
4 "	94.	12.566
4 " 1 "	97.96	13.095
4 " 2 "	102.	13.635
4 " 3 "	106.12	14.186
4 " 4 "	110.32	14.748
4 " 5 "	114 61	15.321
4 " 6 "	118.97	15.90
4 " 7 "	123.42	16.50
4 " 8 "	127.95	17.10
4 " 9 "	132.56	17.72
4 " 10 "	137.25	18.35
4 " 11 "	142.02	18 99
5 "	146.88	19.63
5 " 1 "	151.82	20.29
5 " 2 "	156.83	20.97
5 " 3 "	161.93	21.65
5 " 4 "	167.12	22.34
5 " 5 "	172.38	23.04
5 " 6 "	177.72	23 76
5 " 7 "	183.15	24.48

Dia. of Tanks.	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.
5 ft. 8 in.	188 66	25 22
5 " 9 "	194.25	25.97
5 " 10 "	199.92	26 73
5 " 11 "	205 67	27.49
6 "	211.51	28.27
6 " 3 "	229.50	30.68
6 " 6 "	248 23	33.18
6 " 9 "	267.69	35.78
7 "	287.88	38.48
7 " 3 "	308.81	41.28
7 " 6 "	330.48	44.18
7 " 9 "	352 88	47 17
8 "	376.01	50.27
8 " 3 "	399 88	53.46
8 " 6 "	424.48	56.75
8 " 9 "	449 82	60.13
9 "	475.89	63.62
9 " 3 "	502.70	67 20
9 " 6 "	530.24	70.88
9 " 9 "	558 51	74.66
10 "	587 52	78.54
10 " 3 "	617.26	82 52
10 " 6 "	640 74	86.59
10 " 9 "	678.95	90.76
11 "	710.90	95 03
11 " 3 "	743 58	99 40
11 " 6 "	776.99	103 87
11 " 9 "	811.14	108 43
12 "	846.03	113.10
12 " 3 "	881.65	117 86
12 " 6 "	918.	122.72
12 " 9 "	955.09	127 68
13 "	992.91	132.73
13 " 3 "	1031.50	137.89
13 " 6 "	1070.80	143.14
13 " 9 "	1110.80	148.49
14 "	1151.50	153.94
14 " 3 "	1193.0	159.48
14 " 6 "	1235.30	165.13
14 " 9 "	1278.20	170.87
15 "	1321.90	176.71
15 " 3 "	1366 40	182.65
15 " 6 "	1411.50	188.69
15 " 9 "	1457.40	194.83
16 "	1504.10	201.06
16 " 3 "	1551.40	207.39
16 " 6 "	1599.50	213.82
16 " 9 "	1648.40	220.35
17 "	1697.90	226.98
17 " 3 "	1748.20	233.71
17 " 6 "	1799.30	240.53
17 " 9 "	1851.10	247.45
18 "	1903.60	254.47
18 " 3 "	1956.80	261.59
18 " 6 "	2010.80	268.80
18 " 9 "	2065.50	276.12

Dia. of Tanks.	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.
19 ft.	2120.90	283.53
19 " 3 In.	2177.10	291.04
19 " 6 "	2234.	298.65
19 " 9 "	2291.70	306.35
20 "	2350.10	314.16
20 " 3 "	2409.20	322.06
20 " 6 "	2469.10	330.06
20 " 9 "	2529.60	338.16
21 "	2591.	346.36
21 " 3 "	2653.	354.66
21 " 6 "	2715.80	363.05
21 " 9 "	2779.30	371.54
22 "	2843.60	380.13
22 " 3 "	2908.60	388.82
22 " 6 "	2974.30	397.61
22 " 9 "	3040.80	406.49
23 "	3108.	415.48
23 " 3 "	3175.90	424.56
23 " 6 "	3244.60	433.74
23 " 9 "	3314.	443.01
24 "	3384.10	452.39
24 " 3 "	3455.	461.86
24 " 6 "	3526.60	471.44
24 " 9 "	3598.90	481.11
25 "	3672.	490.87
25 " 3 "	3745.80	500.74
25 " 6 "	3820.30	510.71
25 " 9 "	3895.60	520.77
26 "	3971.60	530.93
26 " 3 "	4048.40	541.19
26 " 6 "	4125.90	551 55
26 " 9 "	4204.10	562.
27 "	4283.	572.66
27 " 3 "	4362 70	583.21
27 " 6 "	4443.10	593.96
27 " 9 "	4524.30	604.81
28 "	4606.20	615.75
28 " 3 "	4688 80	626 80
28 " 6 "	4772.10	637.94
28 " 9 "	4856.20	649.18
29 "	4941.	660.52
29 " 3 "	5026.60	671.96
29 " 6 "	5112.90	683.49
29 " 9 "	5199.90	695.13
30 "	5287.70	706.86
30 " 3 "	5376.20	718.69
30 " 6 "	5465.40	730.62
30 " 9 "	5555.40	742.64
31 "	5646.10	754.77
31 " 3 "	5737.50	766.99
31 " 6 "	5829.70	779.31
31 " 9 "	5922.60	791.73
32 "	6016.20	804.25
32 " 3 "	6110.60	816.86
32 " 6 "	6205.70	829.58
32 " 9 "	6301.50	842.39

31½ gallons equals 1 barrel.

To find the capacity of tanks greater than the largest given in the table, look in the table for a tank of one-half of the given size and multiply its capacity by 4, or one of one-third its size and multiply its capacity by 9, etc.

VARIOUS WEIGHTS OF WATER.

1 cubic inch	.03617	pounds
12 " "	.434	"
1 " foot (salt)	64.3	"
1 " "	62.5	"
1 Cylindrical inch	.02842	"
12 " "	.341	"
1 " foot	49.10	"
1 Imperial gallon	10.	"
1 U. S. "	8.3311	"
1 Cubic foot of water equals	7.48052	U. S. gallons
1 Cylindrical foot of water equals	6.0	" "

A pressure of 1 pound per square inch is exerted by a column of water 2.3093 feet, or 27.71 inches high, at 62° F.

A column of water at 62° F. one foot high presses on the base with a force of .433 pounds, or 6.928 ounces per square inch.

RULES TO ASCERTAIN THE CAPACITY OF CISTERNS AND TANKS.

Cylindrical.

Multiply square of diameter by depth in feet.

For Hogsheads, multiply by 373, divide by 4,000
" Barrels, " " 373, " " 2,000
" Gallons " " 47, " " 8

EXAMPLE—Required, the capacity in barrels (31½ gallons) of a cistern 18 feet deep, 12 feet diameter.

144 sq. of diam.
18 depth.

2,592
373

2,000)966,816(483 bbls.

For tanks that are tapering, measure the diameter four-tenths from the large end.

Square or Oblong.

Multiply length by width, and by depth.

For Hogsheads, multiply by 19, divide by 160
" Barrels, " " 19, " " 80
" Gallons, " " $7\frac{48}{100}$

EXAMPLE—Required, the capacity in barrels (31½ gallons) of a cistern 18 feet long, 12 feet wide, 15 feet deep.

18 length.
12 wide.

216
15 depth.

3,240
19

80)61,560(769 bbls

TABLE SHOWING CAPACITY OF PUMPS OF GIVEN DIAMETER AND LENGTH STROKE.

Dia. of Cyl., ins.	Length of Stroke in Inches, and Capacity Per Stroke in Gallons, of Pump Cylinder with Given Diameter.								
	4	6	8	10	12	14	16	18	20
1¼	.0212	.0319	.0425	.0531	.0637	.0743	.0848	.0955	.1062
1⅜	.0256	.0385	.0513	.0642	.077	.089	.1027	.1156	.1280
1½	.0306	.0459	.0612	.0765	.0918	.1071	.1224	.1377	.1530
1¾	.0416	.0625	.0833	.1041	.1249	.1457	.1666	.1874	.2082
2	.0544	.0816	.1088	.136	.1632	.1904	.2176	.2448	.2720
2¼	.0688	.1033	.1377	.1721	.2063	.241	.2754	.3096	.3442
2½	.085	.1275	.17	.2125	.255	.2975	.34	.3825	.425
2¾	.1028	.1543	.2057	.2571	.3085	.3598	.4114	.4626	.5142
3	.1224	.1836	.2448	.306	.3672	.4284	.4896	.5508	.612
3¼	.1436	.2154	.2872	.3594	.4312	.503	.5748	.6466	.7182
3½	.1666	.2499	.3332	.4165	.4998	.5831	.6664	.7497	.833
3¾	.1912	.2868	.3824	.478	.5736	.6692	.7648	.8605	.9561
4	.2176	.3264	.4352	.544	.6528	.7616	.8704	.9792	1.088
4¼	.2456	.3684	.4912	.6141	.7368	.8596	.9824	1.105	1.228
4½	.2754	.4131	.5508	.6885	.8262	.9639	1.1016	1.2393	1.377
4¾	.3068	.4602	.6136	.7671	.9204	1.073	1.227	1.380	1.534
5	.34	.51	.68	.85	1.02	1.19	1.36	1.53	1.7
5¼	.3748	.5622	.7496	.9371	1.124	1.311	1.499	1.686	1.874
5½	.4114	.6171	.8228	1.0285	1.2342	1.4399	1.6456	1.8513	2.057
5¾	.4496	.6744	.8992	1.124	1.348	1.573	1.789	2.022	2.248
6	.4896	.7344	.9792	1.2240	1.4688	1.7136	1.9584	2.2032	2.448
6¼	.5312	.7968	1.062	1.328	1.593	1.859	2.124	2.39	2.656
6½	.5744	.8616	1.1488	1.4364	1.7955	2.0109	2.2982	2.5885	2.8728
6¾	.6196	.9294	1.239	1.549	1.858	2.168	2.479	2.788	3.098
7	.6664	.9996	1.3328	1.666	1.9992	2.3324	2.6656	2.9988	3.332
7¼	.8168	1.225	1.633	2.042	2.45	2.858	3.266	3.674	4.084
8	.8704	1.3056	1.7408	2.176	2.6112	3.0464	3.4816	3.9168	4.352
9	1.1016	1.6524	2.2032	2.754	3.3048	3.8556	4.4064	5.0572	5.508
10	1.36	2.04	2.72	3.4	4.08	4.76	5.44	6.12	6.8
11	1.6451	2.464	3.2911	4.1139	4.9367	5.7595	6.5823	7.4051	8.2279
12	1.9584	2.9376	3.9168	4.896	5.8752	6.8544	7.833	8.8128	9.792
13	2.297	3.445	4.596	5.745	6.894	8.042	9.192	10.34	11.49
14	2.665	3.997	5.33	6.663	7.994	9.328	10.66	11.99	13.32
15	3.059	4.589	6.119	7.649	9.178	10.70	12.23	13.76	15.29
16	3.48	5.22	6.96	8.703	10.44	12.18	13.92	15.66	17.40
18	4.404	6.606	8.808	11.01	13.21	15.41	17.61	19.81	22.02
20	5.440	8.16	10.88	13.6	16.32	19.04	21.76	24.48	27.2

The figures at the extreme left of the table are piston, or plunger, diameters; the line of figures across the top are piston, or plunger, strokes; the figures in the body of the table are the capacity, or displacement, in gallons, corresponding to a single stroke. To find the capacity, for one revolution, multiply the capacity for a single stroke by two.

HYDRAULICS.

To compute the horse power necessary to elevate water to a given height, multiply the total weight of column of water in pounds by the velocity per minute in feet, and divide the product by 33,000. An allowance of 25 per cent. should be added for friction, etc.

The capacity of pipes increases with the square of their diameter; thus, doubling the diameter of a pipe increases its capacity four times.

To find the quantity of water delivered per foot of travel by a given size pump, square the diameter of the water cylinder in inches; this will give the number of gallons running at a speed of 25 feet per minnte. To find the capacity per foot, divide by 25, multiply by number of feet travel desired. Example: Capacity of 5 inch cylinders desired, at 60 feet per minute. The square of the diameter (5 inches) is 25, which is the quantity delivered at a speed of 25 feet per minute. Divide by 25 to get capacity at one foot, which is one gallon. Multiply by 60 to get capacity at 60 feet travel per minute, which is 60 gallons approximately for single cylinder.

To find the diameter of a pump cylinder to move a given quantity of water per minute, divide the number of gallons by 4, then extract the square root, and the product will be the diameter in inches of a pump cylinder required to do the work at a piston travel of 100 feet per minute.

The area of the steam piston, multiplied by the steam pressure per square inch, gives the total amount of pressure exerted by the steam piston. The pressure divided by the area of the water piston, gives the pressure per square inch, which will be produced in the pump cylinder. The area of the water piston multiplied by the pressure of the water per square inch, gives the resistance caused by the pump piston, a resistance which must be overcome by the steam piston, and a margin must be allowed between power and resistance to move the piston at the required speed. From 25 to 50 per cent. is usually allowed.

To find the area of a piston plunger, multiply the diameter by itself in inches, then multiply by .7854; this will give the area in square inches.

The head of water against which the pump acts is to be measured from the level of the suction water to the level of the discharge water. That is, the entire head, both suction and discharge, should be taken.

Each nominal horse power of boilers requires 1 cubic foot or 7½ gallons of water per hour.

In calculating horse power of tubular or flue boilers, consider 15 square feet of heating surface equivalent to one normal horse power.

Condensing engines require from 20 to 25 gallons of water to condense the steam evaporated from one gallon of water.

The mean pressure of the atmosphere is usually estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury 29.9 inches or a column of water 33.9 feet high.

A "miner's inch" of water is approximately equal to a supply of 12 U. S. gallons per minute.

An imperial gallon contains 277.24 cubic inches.

TABLE OF EFFECTIVE FIRE STREAMS.

Using 100 Feet of 2½-inch Ordinary Best Quality Rubber-Lined Hose Between Nozzle and Hydrant, or Pump.

Smooth Nozzle, Size	¾-inch.						⅞-inch		
Pressure at Hydrant, pounds	32	43	54	65	75	86	34	46	57
" " Nozzle, "	30	40	50	60	70	80	30	40	50
" Lost in 100 feet, 2½ inch Hose, pounds	2	3	4	5	5	6	4	6	7
Vertical Height of Stream, ft.	48	60	67	72	76	79	49	69	71
Horizontal Dist. " "	37	44	50	54	58	62	42	49	55
Gallons Discharged per Min.	90	104	116	127	137	147	123	142	159

Smooth Nozzle, Size	⅞-inch.			1-inch.					
Pressure at Hydrant, pounds	69	80	91	37	50	62	75	87	100
" " Nozzle, "	60	70	80	30	40	50	60	70	80
" Lost in 100 feet, 2½ inch Hose, pounds	9	10	11	7	10	12	15	17	20
Vertical Height of Stream, ft.	77	81	85	51	64	73	79	85	89
Horizontal Dist. " "	61	66	70	47	55	61	67	72	76
Gallons Discharged per Min.	174	188	201	161	186	208	228	246	263

Smooth Nozzle, Size	1⅛-inch.						1¼-inch.		
Pressure at Hydrant, pounds	42	56	70	84	98	112	49	65	81
" " Nozzle, "	30	40	50	60	70	80	30	40	50
" Lost in 100 feet, 2½ inch Hose, pounds	12	16	20	24	18	32	9	25	31
Vertical Height of Stream, ft.	52	65	75	83	88	92	53	67	77
Horizontal Dist. " "	50	59	66	72	77	81	54	63	70
Gallons Discharged per Min.	206	238	266	291	314	336	256	296	331

Smooth Nozzle, Size	1¼-inch.			1⅜-inch.					
Pressure at Hydrant, pounds	97	113	129	58	77	96	116	135	154
" " Nozzle, "	60	70	80	30	40	50	60	70	80
" Lost in 100 feet, 2½ inch Hose, pounds	37	43	49	28	37	46	56	65	74
Vertical Height of Stream, ft.	85	91	95	55	69	79	87	92	97
Horizontal Dist. " "	76	81	85	56	66	73	79	84	88
Gallons Discharged per Min.	363	392	419	315	363	406	445	480	514

NOTES ON FIRE PROTECTION IN FACTORIES.

Fire pumps should be equipped with a relief valve and pressure gauge. It is well to have large capacity. For a five-story mill an allowance should be made of 250 gallons per minute for 1⅛-inch nozzle.

Water mains about the mill and yard should be of ample capacity, to reduce excessive friction losses. The diameter should be based upon a maximum velocity of 10 feet per second. Wherever the mains are subject to severe weather they should be fully protected.

Hydrants and valves should all be right-hand, and in any case the direction to open should be plainly marked. Care should be taken to drain all hydrants before severe weather.

All connections should be made uniform with those of the local fire department. Sizes 2 inch and under should be standard iron pipe thread.

For outside use, on hose reels and for all hose to be used in yard, medium weight rubber-lined cotton hose is best; fabric to be capable of standing a bursting pressure of 400 pounds when new, to have 2½-inch water-way, the lining to be smooth.

For inside use in mills, etc., a good quality rubber lined cotton mill hose is most satisfactory. Unlined linen hose is less expensive but has the greatest frictional resistance or pressure loss, it being from 10 to 50 per cent., increasing with the pressure.

Nozzles should be long, smooth pipes, and when 2½-inch or larger hose is used, swivel handles should be employed. The "Standard Underwriters' Nozzle" is 30 inches long, with swivel handles, and for ordinary use has 1⅛-inch outlet. Short nozzles without handles should not be tolerated for fire purposes; bad accidents often occur by their pulling away from the hosemen. It is essential that nozzles be finished smooth on the inside. A rough or battered nozzle on the inside cannot throw an effective stream.

Use double lines of hose and a Siamese nozzle for a long distance and a hot fire. A double line a thousand feet long delivers a 1¼-inch stream with the same force as a single line 287 feet long. Small streams are all right for small fires, but for large, hot fires use a 1¼-inch or a 1⅜-inch stream. Such a stream will always make a black mark wherever it hits, and the stream which hits and cools the burning coals is the "effective fire stream." Small streams are converted into steam before touching the coals.

Two hundred and fifty gallons per minute is a good standard fire stream with 80 pounds pressure at the hydrant. One hundred pounds pressure should not be exceeded, except for very high buildings or length of hose exceeding 300 feet.

Keep your fire apparatus in readiness for instant use and let your employees be familiar with every part of it by having frequent inspection and drills.

EFFECT OF HEAT UPON VARIOUS BODIES.

When the temperature is below 0 the symbol — is prefixed.

	Deg.
Acetification ends	88
Acetious fermentation begins	78
Air furnace	3300
Ambergris melts	145
Aluminum "	1160
Ammonia (liquid) freezes	—46
Antimony melts	951
Arsenic melts	365
Beeswax melts	151
Bismuth melts	476
Blood (human) heat	98
" " freezes	25
Brandy freezes	—7
Brass melts	1650
Cadmium melts	600
Charcoal burns	800
Cold, greatest artificial	—166
" " natural	—56
Common fire	790
Copper melts	1996
Glass melts	2377
Gold (fine) melts	2282
Gutta percha softens	145
Heat, cherry red	1500
" " (Daniell)	1141
" bright red	1860
" red visible by day	1077
" white	2370
Highest natural temperature, Egypt	117
Ice melts	32
Iron (cast) melts	2100
" (wrought)	2980
" bright red in the dark	752
" red hot in twilight	884
Lard melts	94

	Deg
Linseed Oil boils	597
Lead melts	610
Mercury volatilizes	680
" freezes	—39
Milk freezes	—30
Nitric acid spe. gravity 1.424 freezes	—45
Nitrious Oxide freezes	—150
Olive Oil freezes	—36
Phosphorus melts	108
" boils	560
Pitch melts	91
Platinum melts	3080
Potassium melts	135
Proof Spirit freezes	—7
Saltpetre melts	610
Sea water freezes	—28
Silver (fine) melts	1830
Snow and salt, equal parts	0
Spermacetti melts	112
Spirits of turpentine freezes	14
Steel melts	2500
" polished, blue	580
" " straw color	460
Strong wines freeze	—20
Sulphur melts	226
" acid sp. gravity 1.641 freezes	—45
Sulphur ether freezes	—46
Tallow melts	97
Tin melts	421
Vinegar freezes	—28
Vinous fermentation	60 to 77
Water, *in vacuo*, boils	98
Zinc melts	740

MELTING POINTS OF FUSIBLE PLUGS.

	Softens at	Melts at		Softens at	Melts at
2 Tin, 2 Lead	365	372	2 Tin, 7 Lead	377½	388
2 Tin, 6 Lead	372	383	2 Tin, 8 Lead	395½	408

TEMPERATURE OF FIRE.

Appearance.	Temp. Fah.	Appearance.	Temp. Fah.
Red, just visible	977°	Orange, deep	2010°
" dull	1290°	" clear	2190°
" Cherry, dull	1470°	White heat	2370°
" " full	1650°	" bright	2550°
" " clear	1830°	" dazzling	2730°

WEIGHTS OF VARIOUS SUBSTANCES.

Per Cubic Foot.

Names of Substances.	Aver. Weight, Lbs.
Aluminum	162
Anthracite, solid, of Pennsylvania	93
" broken, loose	54
" " moderately shaken	58
" heaped bushel, loose	80
Ash, American white, dry	38
Asphaltum	87
Brass (Copper and Zinc) cast	504
" rolled	524
Brick, best pressed	150
" common hard	125
" soft, inferior	100
Brickwork, pressed brick	140
" ordinary	112
Cement, hydraulic, ground, loose, American, Rosendale	56
" " " " " Louisville	50
" " " " English, Portland	90
Cherry, dry	42
Chestnut, dry	41
Coal, bituminous, solid	84
" " broken, loose	49
" " heaped bushel, loose	74
Coke, loose, of good coal	27
" " heaped bushel	38
Copper, cast	542
" rolled	548
Earth, common loam, dry, loose	76
" " " moderately rammed	95
" as a soft flowing mud	108
Ebony, dry	76
Elm, dry	35
Flint	162
Glass, common Window	157
Gneiss, common	168
Gold, cast, pure, or 24 carat	1,204
" pure hammered	1,217
Granite	170
Gravel, about the same as sand, which see.	
Hemlock, dry	25
Hickory, "	53
Hornblende, black	203
Ice	58.7
Iron, cast	450
" wrought, purest	485
" " average	480
Ivory	114
Lead	711
Lignum Vitæ, dry	83
Lime, quick, ground, loose, or in small lumps	53
" " " " thoroughly shaken	75
" " " " per struck bushel	66

WEIGHTS OF VARIOUS SUBSTANCES.—Continued.

Per Cubic Foot.

Names of Substances.	Aver. Weight, Lbs.
Limestones and Marbles	168
" " loose, in irregular fragments	96
Mahogany, Spanish, dry	53
" Honduras, dry	35
Maple, dry	49
Marbles, see Limestones.	
Masonry, of granite or limestone, well dressed	165
" " mortar rubble	154
" " dry rubble (well scabbled)	138
" " sandstone, " dressed	144
Mercury, at 32° Fahrenheit	849
Mica	183
Mortar, hardened	103
Mud, dry, close	80 to 110
" wet, fluid, maximum	120
ak, live, dry	59
" white, dry	52
" other kinds	32 to 45
Petroleum	55
Pine, white, dry	25
" yellow, Northern	34
" " Southern	45
Platinum	1,342
Quartz, common, pure	165
Rosin	69
Salt, coarse, Syracuse, N. Y	45
" Liverpool, fine for table use	49
Sand, of pure quartz, dry, loose	90 to 106
" well shaken	99 " 117
" perfectly wet	120 " 140
Sandstones, fit for building	151
Shales, red or black	162
Silver	651
Slate	175
Snow, freshly fallen	5 to 12
" moistened and compacted by rain	15 " 50
Spruce, dry	25
Steel	490
Sulphur	125
Sycamore, dry	37
Tar	62
Tin, cast	459
Turf or Peat, dry, unpressed	20 to 30
Walnut, black, dry	38
Water, pure rain or distilled, at 60° Fahrenheit	62¼
" sea	64
Wax, bees'	60¼
Zinc or Spelter	437

Green timbers usually weigh from one-fifth to one-half more than dry.

STRENGTH OF MATERIALS.

Ultimate Tensile Strength in Pounds per Square Inch.

Metals.	Average
Brass, cast	18,000
" wire	49,000
Bronze or Gun Metal	36,000
Copper, cast	19,000
" sheet	30,000
" wire	60,000
Iron, cast, 13,400 to 29,000	16,500
" wrought, ordinary bar	45,000
" " bar, double refined	50,000 to 54,000
" " boiler plates	48,000 " 56,000
" wire	70,000 " 100,000
" " ropes	90,000
Lead, cast	2,000
" pipe	1,650
Steel	65,000 to 120,000
Tin	4,600
Zinc	3,500

SHRINKAGE OF CASTINGS.

In locomotive cylinders is $\frac{1}{16}$ inch in a foot.
Pipes is $\frac{1}{8}$ inch in a foot.
Girders, beams, etc., is $\frac{1}{8}$ in 15 inches.
Engine beams, connecting rods, etc., is $\frac{1}{8}$ in 16 inches.
Large cylinder, say 70 inch diameter, 10 foot stroke, the contraction of diameter is $\frac{3}{8}$ inch at top, $\frac{1}{2}$ inch at bottom, and $\frac{1}{8}$ inch in 16 inches in length.
Thin brass is $\frac{1}{8}$ inch in 9 inches.
Thick brass is $\frac{1}{8}$ inch in 10 inches.
Zinc is $\frac{5}{16}$ inch in a foot.
Lead is $\frac{5}{16}$ inch in a foot.
Copper is $\frac{3}{16}$ inch in a foot.
Bismuth is $\frac{5}{32}$ inch in a foot.
Tin is $\frac{1}{4}$ inch in a foot.

THE WEIGHT OF ANY PIECE OF WROUGHT IRON.

For Determining.

One cubic foot of wrought iron	= 480	pounds.
" square " one inch thick	= 480/12 = 40	"
" " inch, one foot long	= 40/12 = $3\frac{1}{3}$	"
" " " yard "	= $3\frac{1}{3} \times 3$ = 10	"

The weight of any piece of wrought iron in pounds per yard is equal to ten times its area in square inches.

EXAMPLE.—The area of a bar $3'' \times 1'' = 3$ square inches, and its weight is 30 pounds per yard.

For round iron the weight per foot may be found by taking the diameter in quarter inches, squaring it, and dividing by 6.

EXAMPLE.—What is the weight of 2" round iron?

$2'' = 8$ quarter inches. $8^2 = 64$.
$64/6 = 10\frac{2}{3}$ pounds per foot of 2" round.

EXAMPLE.—What is the weight of $\frac{3}{4}''$ round iron?

$\frac{3}{4}'' = 3$ quarter inches. $3^2 = 9$.
$9/6 = 1\frac{1}{2}$ pounds per foot of $\frac{3}{4}''$ round.

The above rules are highly convenient, and enable mental calculations of weight to be quickly obtained with accuracy.

WEIGHT AND SPECIFIC GRAVITY OF LIQUIDS.

	Specific Gravity	Weight per cubic inch, lbs.	Weight per gallon, lbs.
Water, distilled, 62° F.	1.	.036	8.33
" sea	1.03	.037	8.55
" Dead Sea	1.24	.045	10.4
Acid Acetic	1.062	.038	8.78
" Nitric	1.217	.044	10.16
" Sulphuric	1.841	.067	15.48
" Muriatic	1.2	.043	9.93
Alcohol, pure	.792	.029	6.7
" proof	.916	.033	7.62
" of commerce	.833	.030	6.93
Cider	1.018	.036	8.4
Honey	1.45	.052	12.
Milk	1.032	.037	8.55
Molasses	1.426	.05	11.66
Oil, Linseed	.940	.034	7.85
" Olive	.915	.033	7.62
" Turpentine	.870	.031	7.16
" Whale	.923	.033	7.65
Naphtha	.848	.031	7.
Petroleum	.878	.032	7.39
Tar	1.015	.036	8.4
Wines, average	.998	.036	8.3

WEIGHT AND SPECIFIC GRAVITY OF GASES.

Gas at 32 Degs. and Under One Atmosphere.	Specific Gravity Air = 1.	Cubic Feet in One Pound.
Chlorine	2.44	5.07
Carbonic Acid	1.529	8.10
Oxygen	1.105	11.20
Air	1.000	12.38
Nitrogen	.973	12.72
Carbonic Oxide	.967	12.80
Ammonia	.589	21.01
Light Carburetted Hydrogen	.552	22.41
Coal Gas	.438	28.27
Hydrogen	.069	178.8

METRIC SYSTEM OF WEIGHTS AND MEASURES.

Metric to U. S. Measure. LINEAR MEASURE. **U. S. to Metric Measure.**

Metres= Inches.	Metres= Feet.	Metres= Yards.	Kilo-metres= Miles.	Ins.=Cen-timetres.	Feet= Metres.	Yards= Metres.	Miles= Kilo-metres.
1= 39.37	1= 3.28083	1=1.093611	1=0.62137	1= 2.54	1=0.304801	1=0.914402	1= 1.60935
2= 78.74	2= 6.56167	2=2.187222	2=1.24274	2= 5.08	2=0.609601	2=1.828804	2= 3.21869
3=118.11	3= 9.84250	3=3.280833	3=1.86411	3= 7.62	3=0.914402	3=2.743205	3= 4.82804
4=157.48	4=13.12333	4=4.374444	4=2.48548	4=10.16	4=1.219202	4=3.657607	4= 6.43739
5=196.85	5=16.40417	5=5.468056	5=3.10685	5=12.70	5=1.524003	5=4.572009	5= 8.04674
6=236.22	6=19.68500	6=6.561667	6=3.72822	6=15.24	6=1.828804	6=5.486411	6= 9.65608
7=275.59	7=22.96583	7=7.655278	7=4.34959	7=17.78	7=2.133604	7=6.400813	7=11.26543
8=314.96	8=26.24667	8=8.748889	8=4.97096	8=20.32	8=2.438405	8=7.315215	8=12.87478
9=354.33	9=29.52750	9=9.842500	9=5.59233	9=22.86	9=2.743205	9=8.229616	9=14.48412

WEIGHT (AVOIRDUPOIS).

Centi-grams= Grains.	Kilograms =Ounces Avoirdu-pois.	Kilograms =Pounds Avoirdu-pois.	Metric Tons= Long Tons	Grains= Centi-grams.	Ounces Avoirdu-pois= Grams.	Pounds Avoirdu-pois= Kilograms.	Long Tons =Metric Tons.
1=0.1543	1= 35.274	1= 2.20462	1=0.9842	1= 6.4799	1= 28.3495	1=0.45359	1=1.0161
2=0.3086	2= 70.548	2= 4.40924	2=1.9684	2=12.9598	2= 56.6991	2=0.90719	2=2.0321
3=0.4630	3=105.822	3= 6.61386	3=2.9526	3=19.4397	3= 85.0486	3=1.36078	3=3.0482
4=0.6173	4=141.096	4= 8.81849	4=3.9368	4=25.9196	4=113.3981	4=1.81437	4=4.0642
5=0.7716	5=176.370	5=11.02311	5=4.9210	5=32.3995	5=141.7476	5=2.26796	5=5.0803
6=0.9259	6=211.644	6=13.22773	6=5.9052	6=38.8793	6=170.0972	6=2.72156	6=6.0963
7=1.0803	7=246.918	7=15.43235	7=6.8894	7=45.3592	7=198.4467	7=3.17515	7=7.1124
8=1.2346	8=282.192	8=17.63697	8=7.8736	8=51.8391	8=226.7962	8=3.62874	8=8.1284
9=1.3889	9=317.466	9=19.84159	9=8.8578	9=58.3190	9=255.1457	9=4.08233	9=9.1445

METRIC EQUIVALENTS.

METRIC DENOMINATIONS AND VALUES.			EQUIVALENTS IN DENOMINATIONS IN USE.	
Names.	Number of Litres.	Cubic Measure.	Dry Measure.	Liquid or Wine Measure.
Kilolitre or stere	1000	1 cubic metre	1.308 cubic yards	264.17 gallons.
Hectolitre	100	1-10 of a cubic metre	2 bushels and 3.35 pecks	26.417 gallons.
Dekalitre	10	10 cubic decimetres	9.08 quarts	2.6417 gallons.
Litre	1	1 cubic decimetre	0.908 quart	1.0567 quarts.
Decilitre	1-10	1-10 of a cubic decimetre	6.1022 cubic inches	0.845 gill.
Centilitre	1-100	10 cubic centimetres	0.6102 cubic inch	0.338 fluid ounce.
Millilitre	1 1000	1 cubic centimetre	0.061 cubic inch	0.27 fluid drachm.

METRIC DENOMINATIONS AND VALUES.			EQUIVALENTS IN DENOMINATIONS IN USE.
Names.	Number of Grams.	Weight of what Quantity of Water at Maximum Density.	Avoirdupois Weight.
Miller or tonneau	1,000,000	1 cubic metre	2204.6 pounds.
Quintal	100,000	1 hectolitre	220.46 pounds.
Myriagram	10,000	10 litres	22.046 pounds.
Kilogram or kilo	1,000	1 litre	2.2046 pounds.
Hectogram	100	1 decilitre	3.5274 ounces.
Dekagram	10	10 cubic centimetres	0.3527 ounce.
Gram	1	1 cubic centimeter	15.432 grains.
Decigram	1-10	1-10 of a cubic centimeter	1.5432 grains.
Centigram	1-100	10 cubic millimetres	0.1543 grain.
Milligram	1-1000	1 cubic millimetre	0.0154 grain.

WEIGHTS AND MEASURES.

Troy Weight.

24 grains=1 pwt.
20 pwts.=1 ounce.
12 ounces=1 pound.
3.2 grains=1 carat, diamond weight.
Used for weigning gold, silver and jewels.

Apothecaries' Weight.

20 grains=1 scruple.
3 scruples=1 dram.
8 drams=1 ounce.
12 ounces=1 pound.
The ounce and pound in this are the same as in Troy weight.

Avoirdupois Weight.

27 11.32 grains=1 dram.
16 drams=1 ounce.
16 ounce =1 pound.
25 lbs.=1 quarter.
4 quarters=1 cwt.
2,000 lbs.=1 short ton.
2,240 lbs.=1 long ton.

Dry Measure.

2 pints=1 quart.
8 quarts=1 peck.
4 pecks=1 bushel.
36 bushels=1 chaldron.

Liquid Measure.

4 gills=1 pint.
2 pints=1 quart.
4 quarts= 1 gallon.
31½ gallons=1 barrel.
2 barrels=1 hogshead.

Time Measure.

60 seconds=1 minute.
60 minutes=1 hour.
28, 29, 30 or 31 days=1 calendar month (30 days=1 month in computing interest).
365 days=1 year.
24 hours=1 day.
7 days=1 week.
366 days=1 leap year.

Circular Measure.

60 seconds=1 minute.
60 minutes=1 degree.
4 quadrants=12 signs, or 360 degrees=1 circle.
30 degrees=1 sign.
90 degrees=1 quadrant.

Long Measure.

12 inches=1 foot.
3 feet=1 yard.
5½ yards=1 rod.
40 rods=1 furlong.
8 furlongs=1 statute mile.
3 miles=1 league.

Cloth Measure.

2¼ inches=1 nail.
4 nails=1 quarter.
4 quarters=1 yard.

Mariner's Measure.

6 feet=1 fathom.
120 fathoms=1 cable length.
7½ cable lengths=1 mile.
5,280 feet=1 statute mile.
6,085 feet=1 nautical mile

Miscellaneous.

3 inches=1 palm.
4 inches=1 hand.
6 inches=1 span.
18 inches=1 cubit.
21.8 inches=1 Bible cubit.
2½ feet=1 military pace.

Square Measure.

144 square inches=1 square foot.
9 square feet=1 square yard.
30¼ square yards=1 square rod.
40 square rods=1 rood.
4 roods=1 acre.
640 acres=1 square mile.

Surveyor's Measure.

7.92 inches=1 link.
25 links=1 rod.
4 rods=1 chain.
10 square chains or 160 square rods=1 acre.
640 acres=1 square mile.
36 square miles (6 miles sq.)=1 township.

Cubic Measure.

1728 cubic inches=1 cubic foot.
27 cubic feet=1 cubic yard
40 cubic feet=1 ton (shipping)
128 cubic feet=1 cord (wood).
2150.42 cubic inches=1 standard bushel.
268.8 cubic inches=1 standard gallon.
1 cubic foot=about four-fifths of a bushel

EQUIVALENTS OF VARIOUS MEASURES AND WEIGHTS.

	U. S Gallon.	Cubic Inch.	Cubic foot.	Pound.	Ton.	Liter.	Cubic Meter.
U. S. Gallon	1.	231.	.133	8.33	.00372	3.8	.00378
Imp. "	1.2	277.274	.16	10.	.00446	4.537	.00454
Cubic inch..	.004329	1.	.00058	.03607	.....	.0163	.....
" foot	7.48	1728,	1.	62.35	.028	28.375	.0283
Pound.....	.083	27.72	.016	1.	2240.	.....	.....
Cwt.....	13.44	.....	1.8	.....	20.	.....	.....
Ton.....	268.8	.....	35.9	.....	1.	1000.	1.
Liter.....	.264	61.	.0353	.....	.001	1.	.001
Cubic Meter	264.	61028.	35.31	.....	1.	1000.	1.

One meter=39.37 inches=3.281 feet (act of U. S. Congress).
One inch=25.4 millimetres.
In Apothecary and Troy weights, the pound, ounce and grain are the same.
The following Table compares Troy or Apothecary weights with Avoirdupois:

Avoirdupois.	Troy.
1 lb. equals	7000 gr. 14 oz. 11 dwt. 16 gr. 1.215278 lbs.
1 oz. equals	.9114 oz. 18 dwt. 5.5 gr. 437.5 gr.
1 dram	equals 27.34375 gr.

Troy.		Avoirdupois.
1 lb. . .	equals	.822857 lbs. 13 oz. 2.65 dr.
1 oz. . .	equals	1.097 oz. 17.55 dr.
1 gr. . .	equals	.0365 dr.

METRIC SYSTEM OF WEIGHTS AND MEASURES.

The Metric System was legalized in the United States on July 28, 1866.

The Metric Unit of Length is the Metre = 39.37 inches.

The Metric Unit of Weight is the Gramme =15.432 grains.

The following prefixes are used for subdivisions and multiples: Milli=$\frac{1}{1000}$, Centi=$\frac{1}{100}$, Deci=$\frac{1}{10}$, Deca=10, Hecto=100, Kilo=1.000, Myria=10.000.

French and British (and American) Equivalent Measures.

Measures of Weight.

French.		British and U. S.
1 gramme	=	15.432 grains.
.0648 "	=	1 grain.
28.35 "	=	1 oz. avoirdupois.
1 kilogramme	=	2.2046 pounds.
.4536 kilogramme	=	1 pound.
1 tonne or metric ton	=	.9842 ton of 2240 lbs.
1000 kilogrammes	=	19.68 cwts. 2204.6 pounds.
1.016 metric tons	=	1 ton of 2240 pounds.
1016 kilogrammes	=	

Measures of Capacity.

French.		British and U. S.
1 litre (=1 cubic decimetre)	=	61.023 cubic inches. .03531 cubic foot. .2642 gall. (American). 2.202 lbs. of water at 62° F.
28.317 litres	=	1 cubic foot.
4.543 "	=	1 gallon (British).
3.785 "	=	1 " (American).

Measures of Length.

Metric Denominations and Values.		Equivalents in Denominations in Use.
Myriametre,	10,000 metres	6.2137 miles.
Kilometre,	1,000 "	0.62137 mile or 3.280 ft. 10 ins.
Hectometre,	100 "	328. feet 1 inch.
Dekametre,	10 "	393.7 inches.
Metre,	1 metre	39.37 "
Decimetre,	1-10 of a "	3.937 "
Centimetre,	1-100 " "	0.3937 inch.
Millimetre,	1-1000 " "	0.0394 "

Measures of Surface.

Metric Denominations and Values		Equivalents in Denominations in Use.
Hectare,	10,000 sq. metres	2.471 acres.
Are,	100 square "	119.6 sq. yards.
Centare,	1 " metre	1550. square ins.

TABLE

Showing the Number of Feet, Board Measure, contained in a piece of Joist, Scantling or Timber of the sizes given.

Size in Inches.	Length in Feet of Joists, Scantling and Timber.												
	12	14	16	18	20	22	24	26	28	30	42	44	45
2 x 4	8	9	11	12	13	15	16	17	19	20	28	29	30
2 x 6	12	14	16	18	20	22	24	26	28	30	42	44	45
2 x 8	16	19	21	24	27	29	32	35	37	40	53	58	60
2 x 10	20	23	27	30	33	37	40	43	47	50	70	74	75
2 x 12	24	28	32	36	40	44	48	52	56	60	84	88	90
3 x 4	12	14	16	18	20	22	24	26	28	30	42	44	45
3 x 6	18	21	24	27	30	33	36	39	42	45	63	66	68
3 x 8	24	28	32	36	40	44	48	52	56	60	84	88	90
3 x 10	30	35	40	45	50	55	60	65	70	75	105	110	113
3 x 12	36	42	48	54	60	66	72	78	84	90	126	132	135
4 x 4	16	19	21	24	27	29	32	35	37	40	56	58	60
4 x 6	24	28	32	36	40	44	48	52	56	60	84	88	90
4 x 8	32	37	43	48	53	59	64	69	75	80	112	118	120
4 x 10	40	47	53	60	67	73	80	87	93	100	140	146	150
4 x 12	48	56	64	72	80	88	96	104	112	120	168	176	180
6 x 6	36	42	48	54	60	66	72	78	84	90	126	132	130
6 x 8	48	56	64	72	80	88	96	104	112	120	168	176	180
6 x 10	60	70	80	90	100	110	120	130	140	150	210	220	225
6 x 12	72	84	96	108	120	132	144	156	168	180	250	265	270
8 x 8	64	75	85	96	107	117	128	139	149	160	224	234	240
8 x 10	80	93	107	120	133	147	160	173	187	200	280	294	300
8 x 12	96	112	128	144	160	176	192	208	224	240	336	352	360
10 x 10	100	117	133	150	167	183	200	217	233	250	350	366	375
10 x 12	120	140	160	180	200	220	240	260	280	300	420	440	450
12 x 12	144	168	192	216	240	264	288	312	336	360	504	528	540
12 x 14	168	196	224	252	280	308	336	364	392	420	588	616	630
14 x 14	196	229	261	294	327	359	392	425	457	490	686	716	735

RULE

For Finding the Weight of Castings or Forgings by the Weight of their Patterns.

Multiply the weight of the white pine pattern by

16 for cast iron.
17.1 " wrought iron.
17.3 " steel.
18 " copper.
25 " lead.
12.2 " tin.
13 " brass.
11.4 " zinc.

and the product is the weight of the casting.

TABLE GIVING THE CIRCUMFERENCE AND AREA OF CIRCLES.

Diam.	Circumference.	Area.	Diam.	Circumference.	Area.	Diam.	Circumference.	Area.
1/8	.3926	.0123	20 1/2	64.40	330.06	71	223.05	3959.29
1/4	.7854	.0491	21	65.97	346.36	72	226.19	4071.50
3/8	1.178	.1104	1/2	67.54	363.05	73	229.34	4185.39
1/2	1.570	.1963	22	69.11	380.13	74	232.48	4300.84
5/8	1.963	.3067	1/2	70.68	397.60	75	235.62	4417.86
3/4	2.356	.4417	23	72.25	415.47	76	238.76	4536.46
7/8	2.748	.6013	1/2	73.82	433.73	77	241.90	4656.63
1	3.141	.7854	24	75.39	452.39	78	245.04	4778.86
1/8	3.534	.9940	1/2	76.96	471.43	79	248.19	4901.67
1/4	3.927	1.227	25	78.54	490.87	80	251.33	5026.55
3/8	4.319	1.484	26	81.68	530.93	81	254.47	5153.0
1/2	4.712	1.767	27	84.82	572.55	82	257.61	5281.02
5/8	5.105	2.073	28	87.96	615.75	83	260.75	5410.61
3/4	5.497	2.405	29	91.10	660.52	84	263.89	5541.77
7/8	5.890	2.761	30	94.24	706.86	85	267.04	5674.50
2	6.283	3.141	31	97.38	754.76	86	270.18	5808.80
1/4	7.068	3.976	32	100.53	804.24	87	273.32	5944.68
1/2	7.854	4.908	33	103.67	855.30	88	276.46	6082.12
3/4	8.639	5.939	34	106.81	907.92	89	279.60	6221.14
3	9.424	7.068	35	109.96	962.11	90	282.74	6361.73
1/4	10.21	8.295	36	113.10	1017.88	91	285.88	6503.88
1/2	10.99	9.621	37	116.24	1075.21	92	289.03	6647.61
3/4	11.78	11.044	38	119.38	1134.11	93	292.17	6792.91
4	12.56	12.566	39	122.52	1194.59	94	295.31	6939.78
1/2	14.13	15.904	40	125.66	1256.64	95	298.45	7088.22
5	15.70	19.635	41	128.81	1320.25	96	301.59	7238.23
1/2	17.27	23.758	42	131.95	1385.44	97	304.73	7389.81
6	18.84	28.274	43	135.09	1452.20	98	307.88	7542.96
1/2	20.42	33.183	44	138.23	1520.53	99	311.02	7697.69
7	21.99	38.484	45	141.37	1590.43	100	314.16	7853.98
1/2	23.56	44.178	46	144.51	1661.90	101	317.30	8011.85
8	25.13	50.265	47	147.65	1734.94	102	320.44	8171.28
1/2	26.70	56.745	48	150.80	1809.56	103	323.58	8332.29
9	28.27	63.617	49	153.94	1885.74	104	326.73	8494.87
1/2	29.84	70.882	50	157.08	1963.50	105	329.87	8659.01
10	31.41	78.54	51	160.22	2042.82	106	333.01	8824.73
1/2	32.98	86.59	52	163.36	2123.72	107	336.15	8992.02
11	34.55	95.03	53	166.50	2206.18	108	339.29	9160.88
1/2	36.12	103.86	54	169.65	2290.22	109	342.43	9331.32
12	37.69	113.09	55	172.79	2375.83	110	345.58	9503.32
1/2	39.27	122.71	56	175.93	2463.01	111	348.72	9676.89
13	40.84	132.73	57	179.07	2551.76	112	351.86	9852.03
1/2	42.41	143.13	58	182.21	2642.08	113	355.	10028.75
14	43.98	153.93	59	185.35	2733.97	114	358.14	10207 03
1/2	45.55	165.13	60	188.50	2827.43	115	361.28	10386.89
15	47.12	176.71	61	191.64	2922.47	116	364.42	10568 32
1/2	48.69	188.69	62	194.78	3019.07	117	367.57	10751.32
16	50.26	201.06	63	197.92	3117.25	118	370.71	10935.88
1/2	51.83	213.82	64	201.06	3216.99	119	373.85	11122.02
17	53.40	226.98	65	204.20	3318.31	120	376.99	11309.73
1/2	54.97	240.52	66	207.34	3424.29	121	380.13	11499.01
18	56.54	254.46	67	210.49	3525.65	122	383.27	11689.87
1/2	58.11	268.80	68	213.63	3631.68	123	386.42	11882.29
19	59.69	283.52	69	216.77	3739.28	124	389.56	12076.28
1/2	61.26	298.64	70	219.91	3838.45	125	392.70	12271.85
20	62.83	314.16		.....	.....	.....	.....	.....

AREAS OF CIRCLES AND SIDES OF SQUARES OF THE SAME AREA.

Diameter Multiplied by .8862 Equals Side of an Equal Square.

Diam. of Circle in inches.	Area of Circle in square inches	Sides of Square of same area in square inches.	Diam. of Circle in inches.	Area of Circle in square inches.	Sides of Square of same area in square inches.	Diam. of Circle in inches.	Area of Circle in square inches.	Sides of Square of same area in square inches.
1	.785	.89	21	346.36	18.61	41	1320.26	36.34
½	1.767	1.33	½	363.05	19.05	½	1352.66	36.78
2	3.142	1.77	22	380.13	19.50	42	1385.45	37.22
½	4.909	2.22	½	397.61	19.94	½	1418.63	37.66
3	7.069	2.66	23	415.48	20.38	43	1452.20	38.11
½	9.621	3.10	½	433.74	20.83	½	1486.17	38.55
4	12.566	3.54	24	452.39	21.27	44	1520.53	38.99
½	15.904	3.99	½	471.44	21.71	½	1555.29	39.44
5	19.635	4.43	25	490.88	22.16	45	1590.43	39.88
½	23.758	4.87	½	510.71	22.60	½	1625.97	40.32
6	28.274	5.32	26	530.93	23.04	46	1661.91	40.77
½	33.183	5.76	½	551.55	23.49	½	1698 23	41.21
7	38.485	6.20	27	572.56	23.93	47	1734.95	41.65
½	44.179	6.65	½	593.96	24.37	½	1772.06	42.10
8	50.266	7.09	28	615.75	24.81	48	1809.56	42.58
½	56.745	7.53	½	637.94	25.26	½	1847.46	42.98
9	63.617	7.98	29	660.52	25.70	49	1885.75	43.43
½	70.882	8.42	½	683.49	26.14	½	1924.43	43.87
10	78.540	8.86	30	706.86	26.59	50	1963.50	44.31
½	86.590	9.30	½	730.62	27.03	½	2002.97	44.75
11	95.03	9.75	31	754.77	27.47	51	2042.83	45.20
½	103.87	10.19	½	779.31	27.92	½	2083.08	45.64
12	113.10	10.63	32	804.25	28.36	52	2123.72	46.08
½	122.72	11.08	½	829.58	28.80	½	2164.76	46.53
13	133.73	11.52	33	855.30	29.25	53	2206.19	46.97
½	143.14	11.96	½	881.41	29.69	½	2248.01	47.41
14	153.94	12.41	34	907.92	30.13	54	2290.23	47.86
½	165.13	12.85	½	934.82	30.57	½	2332.83	48.30
15	176.72	13.29	35	962.11	31.02	55	2375.83	48.74
½	188.69	13.74	½	989.80	31.46	½	2419.23	49.19
16	201.06	14.18	36	1017.88	31.90	56	2463.01	49.63
½	213.83	14.62	½	1046.35	32.35	½	2507.19	50.07
17	226.98	15.07	37	1075.21	32.79	57	2551.76	50.51
½	240.53	15.51	½	1104.47	33.23	½	2596.73	50.96
18	254.47	15.95	38	1134.12	33.68	58	2642.09	51.40
½	268.80	16.40	½	1164.16	34.12	½	2687.84	51.84
19	283.53	16.84	39	1194.59	34.56	59	2733.98	52.29
½	298.65	17.28	½	1225.42	35.01	½	2780.51	52.73
20	314.16	17.72	40	1256.64	35.45	60	2827.74	53.17
½	330.06	18.17	½	1288.25	35.89	.....	.....	.....

RULES RELATIVE TO THE CIRCLE.

To find Circumference—
Multiply diameter by 3.1416.
Or divide " " 0.3183.

To find Diameter—
Multiply circumference by 0.3183.
Or divide " " 3.1416.

To find Radius—
Multiply circumference by 0.15915.
Or divide " " 6.28318.

To find Side of an Inscribed Square—
Multiply diameter by 0.7071.
Or multiply circumference by 0.2251.
Or divide " " 4.4428.

To find Side of an Equal Square—
Multiply diameter by 0.8862.
Or divide " " 1.1284.
Or multiply circumference by 0.2821.
Or divide " " 3.545.

Square—
A side multiplied by 1.1442 equals diameter of its circumscribing circle.
A side multiplied by 4.443 equals circumference of its circumscribing circle.
A side multiplied by 1.128 equals diameter of an equal circle.
A side multiplied by 3.547 equals circumference of an equal circle.
Square inches multiplied by 1,273 equals circle inches of an equal circle.

To find the Area of a Circle—
Multiply circumference by one-quarter of the diameter.
Or multiply the square of diameter by 0.7854.
" " " " circumference by .07958.
" " " " ½ diameter by 3.1416.

To find the Surface of a Sphere or Globe—
Multiply the diameter by the circumference.
Or multiply the square of diameter by 3.1416.
" " four times the square of radius by 3.1416.
To find cubic inches in a globe multiply cube of diameter by .5236.
Any circle whose diameter is double that of another contains four times the area of the other.

USEFUL NUMBERS.

Lineal feet,	×.00019	=miles.
" yards,	×.0006	= "
Square inches,	×.007	=square feet.
" feet,	×.111	= " yds.
" yards,	×.0002067	=acres.
Acres,	×.4840	=square yds.
Cubic inches,	×.00058	=cubic feet.
" feet,	×.03704	= " yds.
Circular inches,	×.00546	=square feet.
Cylindrical ins.,	×.0004546	=cubic feet.
" feet,	×.02909	= " yds.
Links,	×.22	=yards.
"	×.66	=feet.
Feet,	×1.5	=links.
Width in chains,	×8.	=acres p. mile.
183,346 circular inches,		=1 square foot.
2200 cylindrical inches,		=1 cubic foot.
Cubic feet,	×7.48	=U. S. galls.
" inches,	×.004329	= " "
Cylindrical feet,	×5.874	= " "
" ins.,	×.0034	= " "
U. S. gallons,	×.13367	=cubic feet.
" "	×231.	= " ins.
Cubic feet,	×.8036	=U. S. bush.
" inches,	×.000466	= " "
U. S. bushel,	×.0495	=cubic yds.
" "	×1.2446	= " feet.
" "	×2150.42	= " ins.
Cylin. feet of water,	×6.	=U. S. galls.
Lbs. avoirdupois,	×.009	=cwt. (112).
" "	×.00045	=tons (2240).
Cubic feet of water,	×62.5	=lbs. avoir.
" ins. "	×.03617	= " "
Cylin. feet of water,	×49.1	= " "
" ins. "	×.02842	= " "
13.44 U. S. galls. of water,		=1 cwt.
268.8 " " "		=1 ton.
1.8 cubic feet of water,		=1 cwt.
35.88 " " "		=1 ton.
Column of water 12 ins. high, 1 inch diameter,		=.341 lbs.

TABLE OF THE PROPERTIES OF SATURATED STEAM.

Gauge Pressure in lbs. per square inch.	Temperature in degrees F.	Total Heat in Heat Units from Water at 32° F.	Heat Units in Liquid from 32° F.	Heat of Vaporization in Heat Units.	Density or Weight of 1 Cubic foot in pounds.	Volume of 1 lb. in Cubic feet.	Weight of 1 Cubic foot of Water.	Factor of Equivalent Evaporation from and at 212° F.
0	212.00	1146.6	180.8	965.8	0.03760	26.60	59.76 (Formula) 59.64 (Observed)	1.0000
10	239.36	1154.9	208.4	946.5	0.06128	16.32	59.04	1.0086
20	258.68	1160.8	227.9	932.9	0.08439	11.85	58.50	1.0147
30	273.87	1165.5	243.2	922.3	0.1070	9.347	58.07	1.0196
40	286.54	1169.3	255.9	913.4	0.1292	7.736	57.69	1.0235
50	297.46	1172.6	266.9	905.7	0.1512	6.612	57.32	1.0269
55	302.42	1174.2	271.9	902.3	0.1621	6.169	57.22	1.0286
60	307.10	1175.6	276.6	899.0	0.1729	5.784	57.08	1.0300
65	311.54	1176.9	281.1	895.8	0.1837	5.443	56.95	1.0314
70	315.77	1178.2	285.6	892.7	0.1945	5.142	56.82	1.0327
75	319.80	1179.5	289.8	889.8	0.2052	4.873	56.69	1.0341
80	323.66	1180.6	293.8	886.9	0.2159	4.633	56.59	1.0352
85	327.36	1181.8	297.7	884.2	0.2265	4.415	56.47	1.0365
90	330.92	1182.8	301.5	881.5	0.2371	4.218	56.36	1.0375
95	334.35	1183.9	305.0	879.0	0.2477	4.037	56.25	1.0386
100	337.66	1184.9	308.5	876.5	0.2583	3.872	56.18	1.0397
105	340.86	1185.9	311.8	874.1	0.2689	3.720	56.07	1.0407
110	343.95	1186.8	315.0	871.8	0.2794	3.580	55.97	1.0417
115	346.94	1187.7	318.2	869.6	0.2898	3.452	55.87	1.0426
120	349.85	1188.6	321.2	867.4	0.3003	3.330	55.77	1.0435
125	352.68	1189.5	324.2	865.3	0.3107	3.219	55.69	1.0444
130	355.43	1190.3	327.0	863.3	0.3212	3.113	55.58	1.0452
135	358.10	1191.1	329.8	861.3	0.3315	3.017	55.52	1.0461
140	360.70	1191.9	332.5	859.4	0.3420	2.924	55.44	1.0469
145	363.25	1192.8	335.2	857.5	0.3524	2.838	55.36	1.0478
150	365.73	1193.5	337.8	855.7	0.3629	2.756	55.29	1.0486
155	368.62	1194.3	340.3	853.9	0.3731	2.681	55.22	1.0494
160	370.51	1195.0	342.8	852.1	0.3835	2.608	55.15	1.0500
165	372.83	1195.7	345.2	850.4	0.3939	2.539	55.07	1.0508
170	375.09	1196.3	347.6	848.7	0.4043	2.474	54.99	1.0514
175	377.31	1197.0	349.9	847.1	0.4147	2.412	54.93	1.0522
180	379.48	1197.7	352.2	845.4	0.4251	2.353	54.86	1.0529
185	381.60	1198.3	354.4	843.9	0.4353	2.297	54.79	1.0535
190	383.70	1199.0	356.6	842.3	0.4455	2.244	54.73	1.0542
195	385.75	1199.6	358.8	840.8	0.4559	2.193	54.66	1.0549
200	387.76	1200.2	360.9	839.2	0.4663	2.145	54.60	1.0555
225	397.36	1203.1	370.9	832.2	0.5179	1.930	54.27	1.0585
250	406.07	1205.8	380.1	825.7	0.5699	1.755	54.03	1.0613
275	414.22	1208.3	388.5	819.8	0.621	1.609	53.77	1.0639
300	421.83	1210.6	396.5	814.1	0.674	1.483	53.54	1.0666

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